Vieux Carré Commission Foundation
Exterior Lighting Design Guidelines
New Orleans, LA

Site Lighting Study
April 2013

Table of Contents

1.0 Introduction

1.1 Executive Summary

This Site Analysis Report investigates the Vieux Carré from a lighting designer's perspective: assessing the current nighttime environment, identifying the problems, and exploring future opportunities.

It provides a general analysis of current lighting conditions in the Vieux Carré by means of a series of recognized lighting criteria.

It will provide a fundamental assessment that will act as the basis for the Vieux Carré Commission's revised exterior lighting guidelines.

The report and the Exterior Lighting Guidelines that result from it, focus primarily on public streetlighting and building mounted architectural lighting. It does not directly address open space lighting, building mounted security/parking area lighting, emergency lighting and so on. While management of all these elements is critical to a successful nighttime environment, they fall outside the purview of this particular document but should form part of a more comprehensive nighttime plan for the area and perhaps the city.

The following is a list of important key criteria and conceptual apparatus utilized throughout the report that serve as critical and guiding lighting design principles.

Legibility

Without light at night, the Vieux Carré would be dark and formless. The addition of light renders a place habitable. Light defines routes and boundaries and emphasizes views and features. Well planned and executed lighting creates memorable, magical images, which are functional and meaningful.

By day, the Vieux Carré's topography is clear and legible. The historic grid is a simple and effective tool for navigation. By night the structure of the grid still prevails, however, destinations and routes become less obvious, and safe navigation more difficult. Providing legible way-finding at night is a critical aspect of any urban environment to help residents, visitors, and tourists navigate and understand the area.

Transition

Human vision takes time to adapt to large variances in light level. Moving between areas of extreme difference in light levels causes pain or virtual blindness. Providing lighting solutions that allow for transitional changes in light magnitude helps increase feelings of safety and supports comfortable navigation throughout the Vieux Carré.

Boundaries

Our perception of places depends upon how surfaces and the extents of a space are lit. The definition of boundaries provides a sense of enclosure. When the perimeter of an area falls into darkness, there is a fear of the unknown, which undermines the sense of security.

By providing lighted perimeter conditions, the boundaries of a space are known and the sense of safety is increased. It is important to light vertical surfaces such as walls and building facades in order to provide an expansive, secure feeling of containment.

Safety and Security

Safe and secure navigation of the nighttime environment is of critical importance, without it streets and urban spaces are uninhabitable at night. While lighting cannot alone provide safety and security, it is a critical part of any successful urban nighttime environment. See section 2.0 for discussion on light, safety and security in the Vieux Carré.

Spectacle/Focal Point

Expression of objects using lighting is a useful way to mark important occurrences in the field of view and helps reinforce way-finding and destination points. A luminous, well-defined sculpture or architectural feature provides a familiar focal point to a night environment, signifies importance, and maximizes sense of place.

Harmony

Lighting design is most often intended to accentuate and enhance architecture. When lighting is out of balance or in conflict with the physical appearance and/or concept, there is a dissonance that undermines the architectural form. Providing light that synchronizes with the architecture creates a harmonic effect that makes intuitive sense and creates attractive logical forms.

Environment

Lighting uses power and causes pollution of various kinds from light pollution itself to various types of manufacturing processes and by-product pollution. In the Vieux Carré; it is essential to establish best practice to balance the district's environmental commitments with a requirement for functionality and beauty.

This document proposes the use of ASHRAE 90.1 2010 as a minimum guideline for its environmental, light pollution, and energy targets.

1.0 Introduction

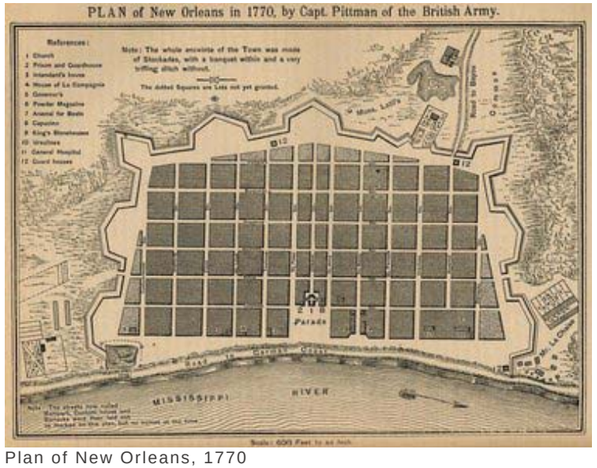
1.2 History and Background

The Vieux Carré (Old Square) Historic District of New Orleans, commonly known as the French Quarter, is compromised of approximately 78 squares.

The buildings within the Quarter include many commercial operations as well as private residences: some single story cottages, some multi-level townhouses, but few exceeding a height of 50 feet. The Quarter is dotted with many recognizable landmarks, such as St. Louis Cathedral. Bourbon Street is a well known tourist and cultural hub, distinct in the French Quarter for its bars and festive atmosphere. In addition to being a tourist destination, the Quarter is home to 3,800 residents and 500+ families, with facilities to support them in their day to day life, including schools, grocery stores, shops, etc.

Due to crime, concerns for public safety, and advances in lighting technology, the Vieux Carré Commission (VCC) has continued to recognize the need to find acceptable methods for lighting public rights-of-way and private dwellings, with growing interest from property owners in the Quarter.

Canal St. Gas Streetlight post, 1823



Plan of New Orleans, 1770

Historic View of Vieux Carré date, unknown

In 1823, gaslight made its New Orleans debut, fittingly enough, in a theatre on Camp Street. From this point forward, widespread use of gas lighting and electrical lighting quickly followed, offering New Orleanians further opportunity of expansion of their public and private realm.

Such was the rate of expansion and technological process that it was unreasonable to expect towns and cities to make wholesale changes to their previous lighting systems. Therefore, much like the grain and texture of all cities, the aggregation of lighting, both gas and electrical, was piecemeal.

The *Daily Delta* in 1851, recording an early demonstration of electric light, noted it *"A magnificent specimen, when in the full display of its power it was positively blinding in its brightness."* In the words of the *Daily Crescent* in regard to same display, *"So intense is the brilliancy of the light, that it pained the eye."* The latter being one of the first recorded instances of "disability glare" the consequences of which in the modern day environment, particularly in exterior urban areas, are now well documented and will be discussed further in this document.

Development continued through the 19th century at a quick pace and in the 1880's New Orleans embarked on a huge number of significant city contracted electrical lighting installations for the public realm. By the end of 1884, there were around 70 miles of electric streetlights in New Orleans. Canal Street was lit from the river to the cemeteries - reputedly the nation's longest row of streetlights. St. Charles Avenue rivaled Canal with lights as far up as Audubon Park. The local press often boasted that New Orleans was the best-lighted city in the world.

In time, gas lighting ceded its prominence to electric lighting and as a consequence came more and more wires and poles. Ultimately, on January 1, 1893, the Edison Company was awarded the contract to light all the city's streets, however not until 1922 would the city's long term electric supplier, New Orleans Public Service, Inc. be established.

During the mid 1880's, businesses and property owners along the commercial section of Canal Street began decorating their buildings with numerous electric light bulbs during the Christmas and Mardi Gras seasons. Attracted by the bright lights, thousands of New Orleanians converged on Canal Street, not only to enjoy the festive seasons, but also to witness the brilliant spectacle that the electric lighting provided.

The practice continues to this day but, in addition to providing spectacle and festivity, artificial lighting has obscured some of the more historical and culturally significant aspects of the city, in particular, the Vieux Carré. It is the role of this document to tease apart the advantages and disadvantages of artificial lighting as it refers to the streets and architecture of this famed and historic district.

1.3 Objectives of Study

The following is a statement from the Vieux Carré Commission Foundation (VCCF):

"The Objective of this study is to develop subtle and sympathetic lighting schemes based on individual properties and building types within the French Quarter in addition to a larger lighting plan that addresses public lighting. Lighting concepts should enhance the quality of light along street elevations and public rights-of-way and must:

-Provide lighting guidelines that address safety and security of the urban context.

-Decrease sky brightness and, as much as possible, reduce light spillage onto adjacent properties.

-Minimize glare from light sources.

-Employ light sources that are affordable to property owners to encourage implementation and that are readily accessible for maintenance and routine lamp replacement.

-Discourage inappropriate applications and revisit the uplighting of individual building facades (currently not allowed).

-Recommend lighting types that are video surveillance compatible and vandal resistant."

This report takes the above statement as the basis for the development of a set of design guidelines for compliance by neighborhood and individual property owners when considering existing and future lighting designs for the Vieux Carré Historic District.

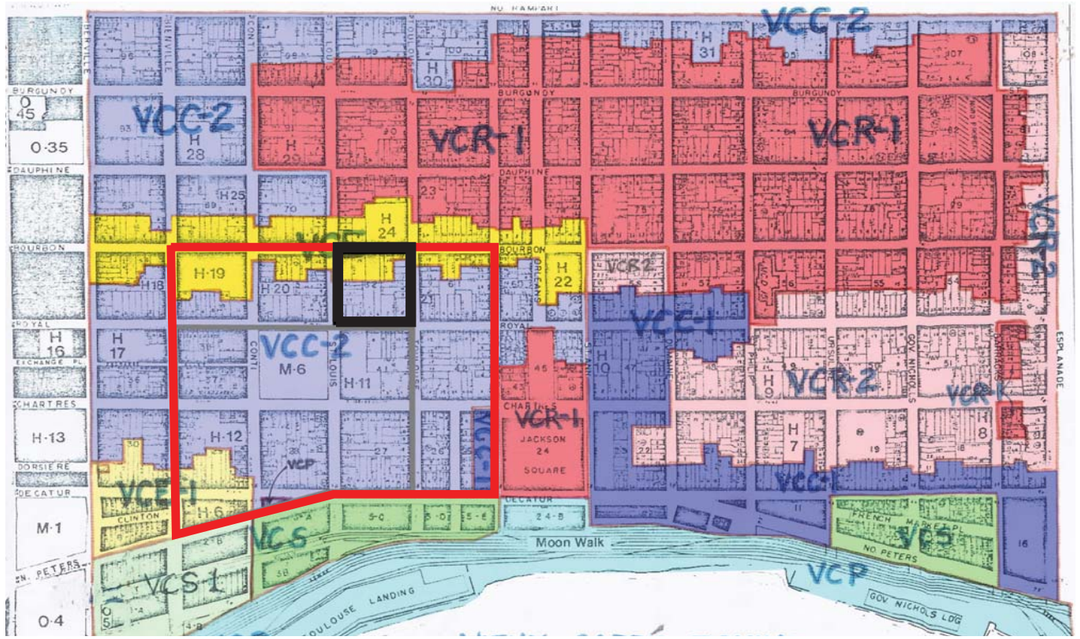
Existing Design Guidelines Within The Vieux Carré:

"The Vieux Carré Commission has an existing set of comprehensive design guidelines, including a section on lighting; however, most of the guidelines are at least 25 years old and many sections are due for revisions. The lighting section, in particular, relies upon outmoded lighting concepts that are no longer relevant, hence the need for this study.

Furthermore, for decades there has been a VCC prohibition on the installation and use of fluorescent lighting, meaning fluorescent tubes, all of which predate the currently available CFL type bulbs that may be used in older, incandescent type fixtures. Additionally provisions in the Code of the City of New Orleans do not allow for private floodlights of any kind in the French Quarter, even though hundreds exist."

This document will replace all relevant lighting codes currently in place for the Vieux Carré, if approved/ adopted by the VCC.

Some of the guidelines and recommendations set forth in this document are in the form of conceptual strategizing, some are intended to be developed over time, others call for immediate directive action and monitoring. Ultimately, the goal is to bring into one arena the various disparate elements that make up and affect the nighttime environment of the Vieux Carré . This will allow a greater appreciation of the obstacles and opportunities on the path to achieving appropriate, workable legislation to increase the quality of life at night for this historic district and its inhabitants.



Vieux Carré Zoning Diagram

Area of Study

- Square No. 62
- Extended area of Study

Vieux Carré Districts

- VCR-1: Vieux Carré Residential District
- VCR-2: Vieux Carré Residential District
- VCC-1: Vieux Carré Commercial District
- VCC-2: Vieux Carré Commercial District
- VCS: Vieux Carré Service District
- VCS-1: Vieux Carré Service District
- VCE: Vieux Carré Entertainment District
- VCE-1: Vieux Carré Entertainment District
- VCP: Vieux Carré Park District

1.4 Lighting Criteria and Area of Study

The Vieux Carré in its entirety includes all the land stretching along the Mississippi River from Canal Street to Esplanade Avenue (twelve blocks) and inland to North Rampart Street (seven to nine blocks). Totalling 78 urban blocks.

It falls into the Illumination Engineering Society's Lighting Zones two and three (LZ2/3), which pertain to areas with moderate and moderately high ambient lighting levels:

"These typically include multi-family residential uses, institutional residential uses, schools, churches, hospitals, hotels/motels, commercial and/or business areas with evening activities embedded in predominantly residential areas, neighborhoods serving recreational and playing fields and/or mixed use development with a predominance of residential uses.

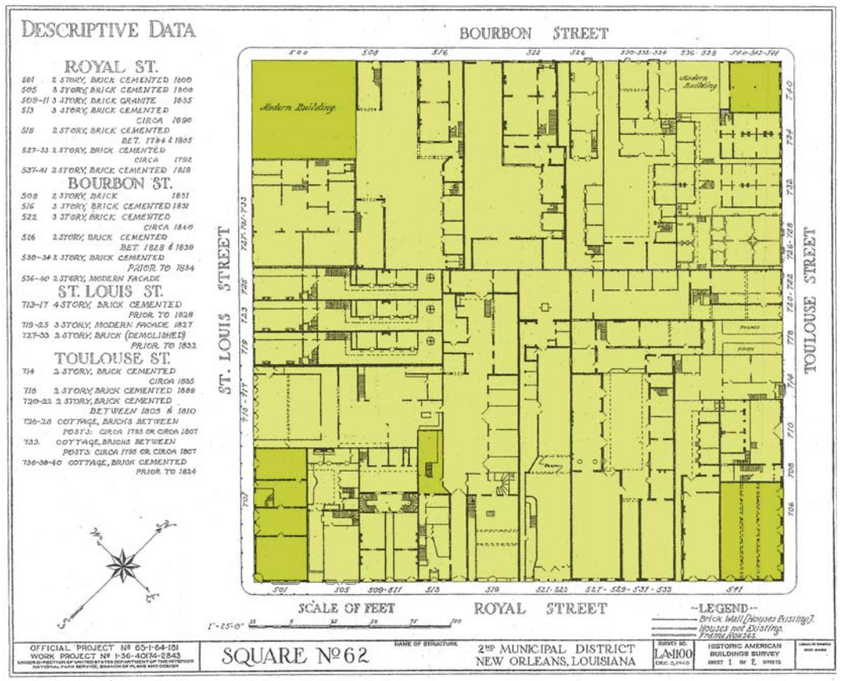
It is the recommended default zone for lighting commercial business districts and high density or mixed use residential districts. Including neighborhood business districts; churches, schools and neighborhood recreation facilities; and light industrial zoning with modest nighttime uses or lighting requirements.

Lighting is generally desired for safety, security, and or convenience (LZ 2+3) and where appropriate uniform or continuous (LZ3 only). After curfew, lighting may be extinguished or reduced in most areas as activity levels decline."

IESNA The Lighting Handbook 10th Edition.

See table 1.1 opposite for definitive information on recommended illuminance levels for roadways, pedestrian routes and outdoor plazas.

Square No. 62 (Royal/Toulouse/Bourbon/St. Louis) and surrounding blocks were the focus of this study. This block and its immediate surrounds are centrally located within the Vieux Carré commercial and entertainment districts yet still contain a number of residential units within them. As a result it is an ideal location to assess the different architectural typologies that occur within the Vieux Carré.
Refer to pages 8-9 for further discussion on Square No. 62.



Vieux Carré Square No. 62

Illuminance- Recommended Values

Location	Uniformity	Pedestrian Conflict	Horizontal Average (fc)	Vertical Min. (fc)
Pedestrian Walkways	4:1	High	1.0	0.5
		Medium	0.5	0.4
		Low	0.4	0.1
Local Roads	6:1	High	0.9	
		Medium	0.7	
		Low	0.4	

ANSI/IESNA RP-8-00

Location	Uniformity	Zone	Activity Level	Horizontal Average (fc)	Vertical Average (fc)
Outdoor Plazas	1:5	LZ2	High	0.4	0.2
			Medium	0.2	0.1
			Low	0.1	0.0
		LZ3	High	0.6	0.2
			Medium	0.4	0.2
			Low	0.2	0.1

Table 1.1 IESNA The Lighting Handbook 10th Edition

Pedestrian Conflict Classifications

The interaction between pedestrians and vehicles is responsible for a disproportionate number of nighttime fatalities. The magnitude of pedestrian flow is nearly always related to the abutting land use. Three classifications of pedestrian night activity levels and the types of land use with which they are typically associated are given below:

High - Areas with significant numbers of pedestrians expected to be on the sidewalks or crossing the streets during darkness. Examples are downtown retail areas, near theaters, concert halls, stadiums and transit terminals. **Commercial District Bourbon, Dauphine and Decatur Streets are examples of high activity areas.**

Medium - Areas where lesser numbers of pedestrians utilize the streets at night. Typical are downtown office areas, blocks with libraries, apartments, neighborhood shopping, industrial, older city areas and streets with transit lines. **Commercial District cross streets Toulouse, St. Louis and Conti are examples of medium activity areas.**

Low - Areas with very low volumes of night pedestrian usage can occur in any roadway classification but may be typified by suburban single family streets, very low density residential developments, and rural or semi-rural areas. **Residential District Barracks, St. Philips, Ursulines Streets are examples of low activity areas.**

Uniformity Ratio: Is the ratio between the maximum and the minimum illumination level on a particular surface in question, e.g. A surface with a maximum level of 10fc and a minimum of 2fc will have a uniformity ratio of 5:1.

1.4 Lighting Criteria and Area of Study

Toulouse Street

Toulouse Street is bounded by the more commercially vibrant Bourbon to the West and Royal to the East. It is, therefore, affected greatly by the spillover activity from both. It has the perception of a cross street with transition from one major artery to another.

This being the case, the street's identity at night has three distinct feels: the first two in direct association with the feel of Bourbon and Royal Streets, the third being the central zone where building use and feel is of a more residential nature.

Instances of glare and poor color rendering are common with the public streetlighting playing only a small role in the perception of the nighttime environment, partly due to non functioning lamps and haphazard location of streetlights.

Light levels are lower towards the center portion of street due to there being less commercial activity. Please refer to the light level recommendations on page 7 table 1.1. While light levels are lower, crime levels are too. It seems this is in part due to the amount of foot traffic and therefore there being fewer opportunities for criminal behavior but it does reaffirm that lower light levels alone do not necessarily result in higher crime.

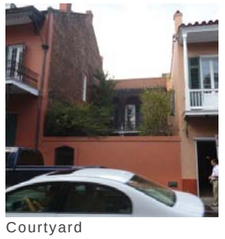
The lighting of Toulouse Street at night lacks coherence. The transition between the three separate identities requires management as does fixture type and performance in relation to the eclectic mix of architecture and function.

An important challenge for this street is matching the nighttime illumination of buildings in accordance with their architectural or historical significance.

Toulouse Daytime Photomerge

Soffit glare

Overlit sidewalk



Courtyard

Streetlight glare

Overscaled fixtures

Street utilities

Bourbon Street

Bourbon Street is the best known of all French Quarter streets. Day and night, it is a lively place with many bars and a lot of commercial activity.

At night there is a predominance of colored light, some of it dynamic, generally by means of facade lighting and signage. A lot of neon light has been grandfathered in over time and should be re-assessed against the criteria of this document with enforced removal if deemed inappropriate.

Instances of glare and poor color rendering are many with the public streetlighting playing little role in the perception of the nighttime environment.

Crime is highest in this area of the French Quarter due to many reasons other than lighting. However, the current glary, overly lit and poorly organized lighting adds to the general melee.

On Bourbon Street at night, the architecture feels of secondary importance and is to a significant degree obscured by the excessively colorful lighting. This separation of performance from architecture can enhance the ambience at night, but it requires appropriate management of both lighting effect and the nighttime architectural image in order to provide a truly harmonious and memorable experience.

Bourbon Daytime Photomerge

Colorful facades

3 Storey townhouse

Courtyard shopfront

Damaged streetlight

Colorful surfaces

1.4 Lighting Criteria and Area of Study

St. Louis Street

St. Louis Street, like Toulouse, is bounded by the more commercially vibrant Bourbon to the West and Royal to the East. It also is affected greatly by the spillover activity from both and similarly has the perception of a cross street with transition from one major artery to another.

Again, like Toulouse, the street's identity has three separate zones - the first two responding to Bourbon and Royal Streets, and the third inner, or central, zone where the feeling is more low-key and sedate.

Glare and poor color rendering are commonplace with the public streetlighting playing a limited role in the perception of the nighttime environment. Again, this is partly due to non-functioning lamps and haphazard location of streetlights.

Light levels drop off towards the central zone of the street as commercial activity decreases.

Light levels are lower but crime is also, again affirming that lower light levels alone do not necessarily result in higher crime.

Like Toulouse, an important challenge for this street is matching the nighttime illumination of buildings against their architectural or historical significance.

St. Louis Daytime Photomerge

Shopfront at dusk

Gallery

Glow from within as feature lighting

Illuminated menu

Royal Street

Royal Street runs parallel and adjacent to Bourbon, and while it is a major commercial artery for the area, it is very different in character. Commercial activity is more subdued and building use tends towards restaurants, galleries, light industrial workshops, and a well recognized antiques district.

At night, colored lighting is somewhat controlled and there are some instances of appropriate and harmonious internal and signage lighting. However, there is not enough of it to form a coherently illuminated feel to the street.

Instances of glare and poor color rendering are prevalent with the public streetlighting playing only a small role in the perception of the nighttime environment.

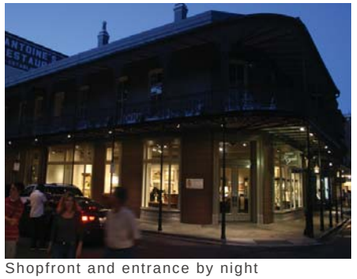
On Royal Street at night there seems to be the beginnings of, or at least a potential for, a coherent lighting solution that could bring the street and its uses greater prominence and vitality at night.

Royal Street Daytime Photomerge

Sidewalk and entrance by day

Canopy at night

Canopy by day



Shopfront and entrance by night

2.0 Contextual Analysis

This section includes the following topics:

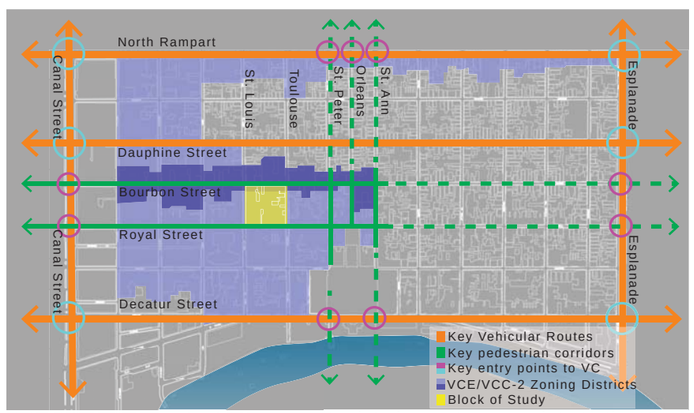
2.0 Contextual Analysis

2.1 City and Neighborhood

In the long term, any lighting guidelines have to consider integration and connection to the rest of the city at night. The Vieux Carré is a key nodal area of the city and, as such, requires clearly defined routes both to and from it.

Opportunities to define hierarchies of routes arise based on a clear understanding of nighttime function and level of nighttime activity. For example, entertainment zones and residential zones could be illuminated by different methods or to different illuminance levels in order to better define important paths and edges.

Urban Context Diagram: Depicts the Vieux Carré's critical connections to adjacent neighborhoods and greater urban area. It also shows the two major edges in play, the Mississippi River and I-10.



Neighborhood Context Diagram: Depicts key entrance points to the Vieux Carré and key vehicular and pedestrian routes as they occur in relation to Zoning Districts.

2.2 Streets and Blocks

The urban block of the Vieux Carré cedes public space to the street in a cohesive and multidirectional manner. During the day, streets are bathed in daylight and full of activity. This provides a strong sense of community and informal surveillance.

Building heights vary along the street frontages, but are not so differentiated as to cause significant shading or other climactic concerns. Roadways are typically 19'-0" to 25'-0" wide with sidewalks approximately 8'-0" wide.

At night this strong physical definition is maintained to some degree, but a lack of coherence in terms of legibility and destination leads to uncertainty and ambiguity.

Essentially the illumination of the streets and blocks at night consists of two separate systems.

1. Streetlight

The approach to the illumination of the Vieux Carré, as in the case of most urban environments, has been piecemeal. The Vieux Carré's scale and historic status, among other things, has hindered areawide and wholesale infrastructural improvements.

As a result, the streetlighting system is not effective enough to provide the strong uniform datum required to ensure safe and clear passage to all areas of the Vieux Carré at night.

Further to this, parked traffic at night blocks streetlight and over 30% of the fixtures are broken and haphazardly placed. All this conspires to create an ineffectual lighting solution for the Vieux Carré.

The ANSI/IESNA RP-8-00 for roadway lighting recommendations for illuminance both horizontally and vertically are shown on page 7, table 1.1. Any new or upgraded streetlighting proposals should use this criteria as the critical basis for developing effective solutions.

For further discussion on Vieux Carré streetlighting see Sections 3.5 and 4.1

2. Building light

The secondary and more individually driven solution is building mounted lighting, implemented in order to provide focus on residential and commercial properties and, much needed in places, supplemental lighting to the sidewalk.

This individual/proprietor driven approach has resulted in a myriad of lighting solutions. While in some instances this is effective in producing light, often, it is glaring, haphazard, unsightly, lacking in clear intent, and out of control.

Too much flexibility coupled with individuated responses has resulted in chaotic, high contrast, and sometimes unsafe lighting of building frontages and public sidewalks.

2.3 Facades and Typologies

This report has identified a number of distinct building types in the Vieux Carré as defined by the VCCF:

1. Creole Cottage without Abat-vent
2. Creole Cottage with Abat-vent
3. Creole Cottage Side-view
4. Shotgun Single
5. Shotgun Double
6. Creole Townhouse with Entresol
7. Creole Townhouse with Porte Cochere
8. Creole Townhouse Spanish Colonial
9. American Townhouse Two Story
10. American Townhouse Three Story
11. American Townhouse with Gallery
12. Corner Storehouse with Gallery
13. Corner Storehouse with Canopy
14. Courtyard
15. French Colonial
16. Typical Details

Heights vary between 1 - 4 stories generally, increasing in scale within commercial and entertainment zones.

Building facade elements include balconies, galleries, canopies, entrances, windows and doorways, all of which to one degree or another receive light treatment at night.

Lighting treatment of specific facades is haphazard with very little emphasis on lighting technique, architectural harmony, or detailing.

The design of any facade lighting should fully consider the appropriate distribution of light and the surface it is intended to illuminate.

Distribution of light can be expressed as angle and intensity. High intensity equates to elevated light levels, but can also create glare which reduces the perception of everything that is lighted (see 3.1 Glare and Brightness). Light reflects off surfaces allowing them to be seen. Lightly colored surfaces bounce more light back into the environment than dark, light-absorbing surfaces. Understanding this simple principal could help mitigate some of the light discord within the Vieux Carré.

Bourbon Street

Toulouse Street

St. Louis Street

Bourbon Street

Royal Street

2.4 Decorative/Historic Fixtures, Shopfronts, Signage and Street Furniture

As stated previously, the aggregation of lighting solutions within the Vieux Carré has taken place over a long time and, as a result, light fixtures themselves span many decades in terms of technological capability and aesthetic.

This haphazard aggregation of fixtures has resulted in a multitude of mounting details, scales of fixture and illumination techniques, all cobbled together by an unsightly network of exposed cable and conduit.

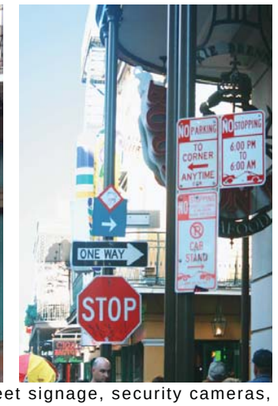
A general approach to lighting fixtures has to manage materiality, distribution, durability, dimensionality, power supply, finishes, mounting, installation, and availability.

Similar to light fixture aggregation, a cornucopia of trash cans, traffic signs, newspaper stands, traffic cones and so on, causes visual clutter and physical obstruction of the sidewalks.

For more information on these elements see Sections 3.6 Shopfronts, 3.7 Signage, 3.8 Awnings and 3.9 Street Furniture.

Wall-mounted electric lights in gaslight style

Wall-mounted gaslight



Streetlights, lanterns, street signage, security cameras, traffic control and advertising

Window display with partial glare problem

2.5 Light and Safety

The Vieux Carré, like many inner city areas, has a significant crime issue. The causes of crime are widespread and its control and containment are areas of study far beyond the scope of this document. However, this question should still be asked here: What significant role, if any, does lighting play in regard to crime in the Vieux Carré?

Since authorities in France decided to suspend lanterns on cables over the center of streets in 1667, there have been innumerable studies carried out with the aim of establishing the impact of lighting on crime, with each concluding that there is extreme difficulty in ascertaining dependable statistical evidence.

Improving lighting can lead to a decrease in crime, **but** it may not. There can be no guarantees. After all, if all that was necessary to prevent crime was to provide a lot of light, there would be no crime during the daytime.

Lighting is only one of many factors that can influence the incidence of crime.

Further conclusions reached seem to be that there is no statistically significant evidence to suggest that improved street lighting influences the level of street crime. However, there is some indication that improved street lighting decreases the fear of crime.

Better lighting may affect the perception of risk by increasing the ease of surveillance of the street, either formal, by the police in person, or through a CCTV system, or informal, by members of the community. Better lighting may increase the effort required by enabling potential victims to take action at a distance and by limiting the locations where victims can be taken by surprise.

In summary, lighting does not have a direct effect on the level of crime. Rather, lighting can affect crime by two indirect mechanisms. The first is the obvious one of facilitating surveillance by authorities and by community after dark. The second mechanism by which an investment in better lighting might affect the level of crime is by enhancing community confidence and hence increasing the degree of informal social control.

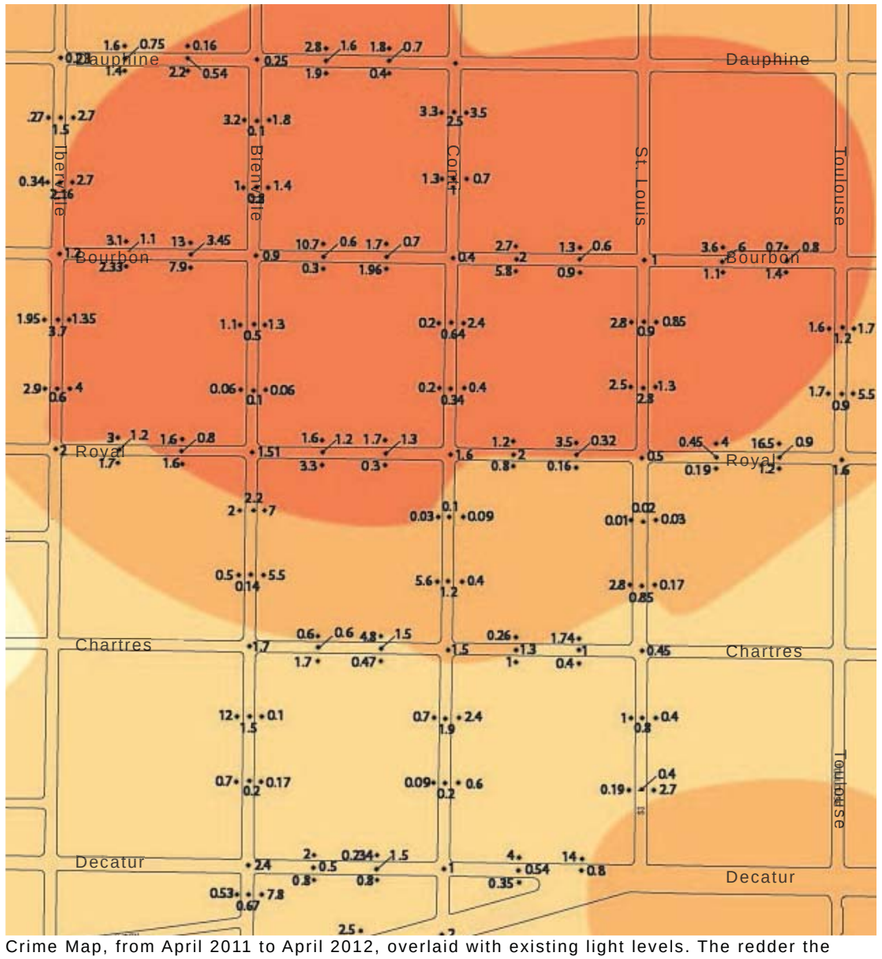
The aspects of lighting that are most important in this instance are the average illuminance, the illuminance uniformity, the glare, the light source color properties and the illumination of boundaries.

The usual practice for street lighting is to ignore the reflected light and only consider the first surface of direct light. This is reasonable for practice given the great diversity of situations in which streetlighting is installed, but, if there are any nearby surfaces, it is worth remembering that high reflectance, diffusely reflecting surfaces produce much more diffuse lighting. This will increase the adaptation illuminance, reduce the strength of any shadows, and diminish the impact of disability glare.

Illuminance is not the only aspect of lighting that matters to the perception of safety at night. The variability in perceived safety at night, particularly at low illuminances, suggests there are other factors operating in addition to illuminance. Uniformity of illuminance and the presence of disability glare also matter to perceptions of safety.

In the Vieux Carré, current lighting solutions do not maximize the potential to increase feelings of safety. The ubiquitous use of exposed PAR lamps and unshielded floodlights, typically mounted between 10-20ft, are a significant source of disability glare and “temporary blindness”. Colored light fixtures reduce visual acuity and non-operational streetlights, or ones with limited distribution, all contribute to an illuminated environment that is glary, non-uniform, and lacking in cohesion and required illuminance.

The street variances in levels indicate no correlation between crime and light levels. In fact, areas with low levels also have low incident of crime indicating other factors are in play. When analyzed through the lens of crime and perceptions of safety the argument for an entire overhaul of the current lighting systems of the Vieux Carré could not be more apparent.



Crime Map, from April 2011 to April 2012, overlaid with existing light levels. The redder the color the more violent the crime area (Dr. Capowich, Loyola University).

2.5 Light and Safety

For the period 6/26/12-9/26/12 (the latest figures available at time of writing) there were 793 crimes reported within a 1 mile radius of 701 Dumaine St.

The crimes range from DWI, shoplifting and domestic battery to armed robbery and rape. One murder was reported.

Approximately 38% of these crimes occurred during the late evening and early morning hours or the 8 hours between 11 pm and 7 am. A wider cross section of the year needs to be examined, especially January-April, since these are the peak tourist months in New Orleans.

As a result of concerns regarding crime at night a proposed study by The French Quarter Management District for a pilot security lighting system will take place in Spring 2013.

The diagrams and cutsheets opposite depict the current intended layout and specification of equipment.

Tillotson Design Associates have entered into preliminary discussion with JBA Consulting Engineers in regard to this scheme.

Any CCTV illumination requirements have to be coordinated with lighting guidelines and, further, mounting requirements (pole mounted, building mounted, and so on) have to be reviewed in detail.

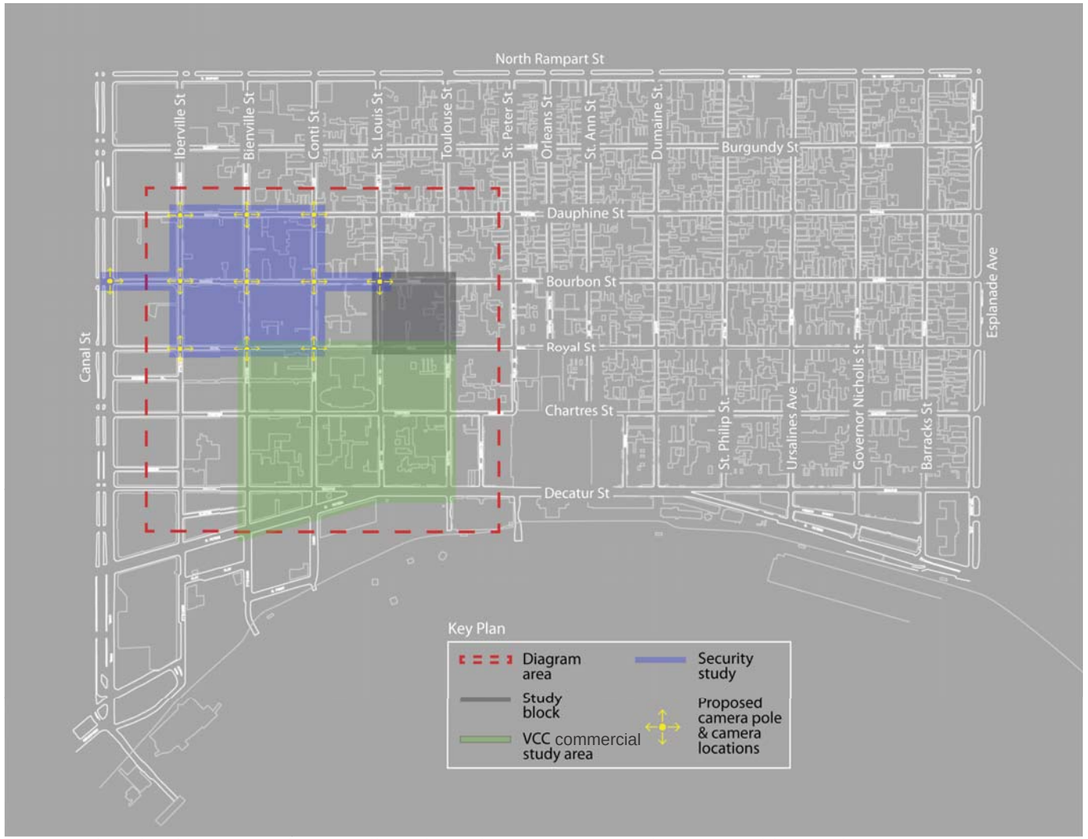
For further information on the Security Lighting Pilot Scheme see The French Quarter Video Surveillance

I. All Crimes

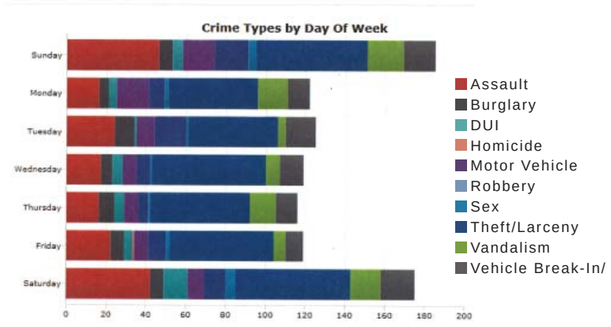
The pattern of crime throughout the day shows a trough of criminal activity during the 7 AM hour. A spike in reported crimes occurs during the mid-day lunch hour. There are two pronounced hour to hour increases in crime, one between the 10 PM hour and the 11 PM hour, and the second between the 12 AM and the 1 AM hour.

FIG. 21: Distribution of All Reported Crime, 2005-2009

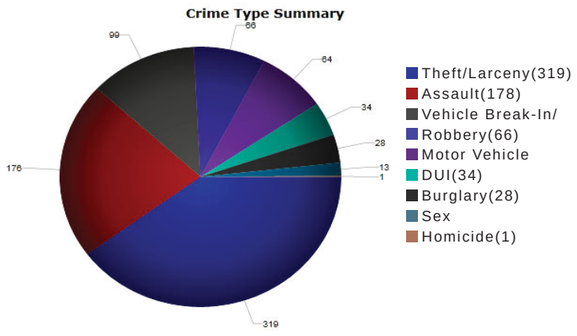
Vieux Carré Crime Map for all crime 2005-2009

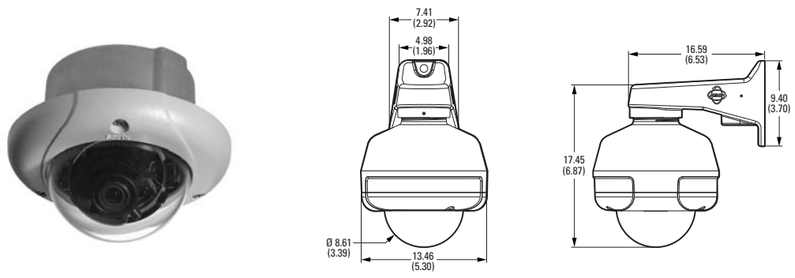


Concept plan showing proposed CCTV pilot scheme layout - courtesy of JBA Consulting Engineers



Vieux Carré Crime type by day of week 6/26/2012-9/26/2012





HD Digital Cameras for security - courtesy of JBA Consulting Engineers

3.0 Lighting Analysis

The IESNA Lighting Handbook defines visibility as, “the ability to extract information from the field of view.” Visibility is affected by glare, uniformity, illuminance, surface brightness, and lighting equipment. The consideration of these factors improves performance, mood, atmosphere, visual comfort, aesthetic judgement, health, safety & well-being, and social communication.

This section of the document aims to address the above through analysis of the criteria most relevant to the issues concerning the current lighting of the Vieux Carré which are;

3.1 Glare and Brightness
3.2 Uniformity and Darkness
3.3 Color
3.4 Color Rendering
3.5 Streetlight
3.6 Shopfronts
3.7 Signage
3.8 Awnings
3.9 Street Furniture
3.10 Lighting Control
3.11 Light Fixtures
3.12 Facade Bisection
3.13 Traffic

3.0 Lighting Analysis

3.1 Glare and Brightness

One of the most significant lighting problems affecting the Vieux Carré is glare and over brightness. Glare is caused by excessive light entering the eye from a bright light source. The potential for glare exists anytime one can “see” a light source.

Lighting glare is generally categorized as either discomfort glare or disability glare. Discomfort glare is uncomfortable to look at but interferes minimally with vision. Disability glare, however, is so bright in the field of view that it causes dysfunction. Disability glare affects vision in two ways: it temporarily depletes the photopigments in the eyes which allow human vision and it causes the pupil to constrict, scattering light, known as veiling. The depletion of photopigments can eliminate night vision and can take up to 2 minutes to fully readapt. The constriction of the pupil and subsequent veiling only allows visibility of the brightest object in the field of view, which is usually the light source and not the pathway, approaching pedestrians, or cars.

Disability glare is caused by two factors: intensity and distribution. Lighting equipment that has intense light at high angles causes disability glare. Light poles or building mounted fixtures, for example, which use high wattage lamps that are exceedingly intense at high angles cause glare which disables pedestrian vision.

The effective use of indirect light, appropriate wattage, optics and shielding will minimize the effects of glare.

Glare occurs throughout the Vieux Carré, most notably as a result of surface mounted PAR lamp fixtures of various kinds

Overly lit shopfronts, here on St. Louis, are common throughout the View Carré

Building and entrance glare on Bourbon and St. Louis

3.2 Uniformity and Darkness

Poor uniformity of light can cause adaptation problems for the individual. This is critically important in exterior spaces of the Vieux Carré where issues of safety and security are paramount.

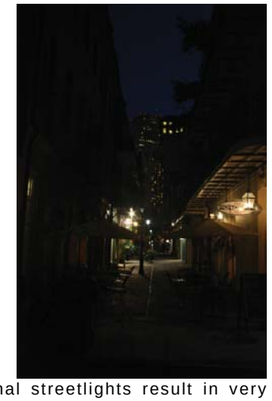
Poor uniformity is the result of inappropriately spaced fixtures, but also due to overly lit surface areas which cause high contrast and glare problems.

Darkness is a critically important element of the nighttime environment. It helps to provide degrees of contrast in order to allow us to differentiate objects and, like light itself, should be defined and managed appropriately.

Too much darkness can induce feelings of insecurity and concerns about safety. However, without darkness there is no contrast or legibility. Flatly illuminated, sterile environments can result when spaces are over or uniformly lit.

Darkness can provide places of intimacy and quiet contemplation, highlight areas of interest, and provide appropriate hierarchy of elements. However, when the expanse of dark is too great, or the destination is not visible, people become unwilling to walk there. This can begin a cycle of civil abandonment of space which can lead to an increase in crime and intimidation.

An appropriate response for the Vieux Carré may be to retain, as much as possible, the intimate residential quality of certain streets and carefully redesign areas of unplanned and unsafe darkness, rather than providing a blanket set of overly bright or uniform conditions. This way the unique charm of the Vieux Carré may be maintained.



None, too few, or non-operational streetlights result in very dark areas with little/no ambient or vertical plane illumination

Lack of uniformity on facades and sidewalks, when coupled with dark areas, results in lack of legibility and impedes intuitive wayfinding

Lack of vertical plane or perimeter boundary illumination is common throughout the Vieux Carré

3.3 Color

Colored light can make a significant contribution to the image and spectacle of a neighborhood but can also very easily become out of control, causing disharmony and visual chaos.

It is clear from the examples cited opposite that the latter is the case in specific commercial areas of the Vieux Carré.

There are a number of factors causing this, notably overly bright and obtrusive colored signage and colored light washing facades and buildings - in many cases in a hue that has no connection to the color of the building itself.

It is important not to remove the spectacle and color that the area is, in part, famed for, but at the same time this document recommends greater enforcement of, and methodology for, colored signage and facade lighting.

Toulouse Street

At night on Bourbon St., too much color results in disharmony, lack of differentiation, and visual chaos. Note in particular inappropriate colored light being used on facades with non-complimentary colored paint or stucco finish.

Facades in the Vieux Carré have a strong color identity by day, which can be accentuated by white light at night.

3.4 Color Rendering

White light is comprised of a rainbow of colors. Human vision can perceive white light by combining the primary colors of red, green and blue. However, not all the colors of light are represented in red, green and blue. The more colors of light used equally to create white light, the better the light source can render colors. Color Rendering is the term used to describe the color quality of light.

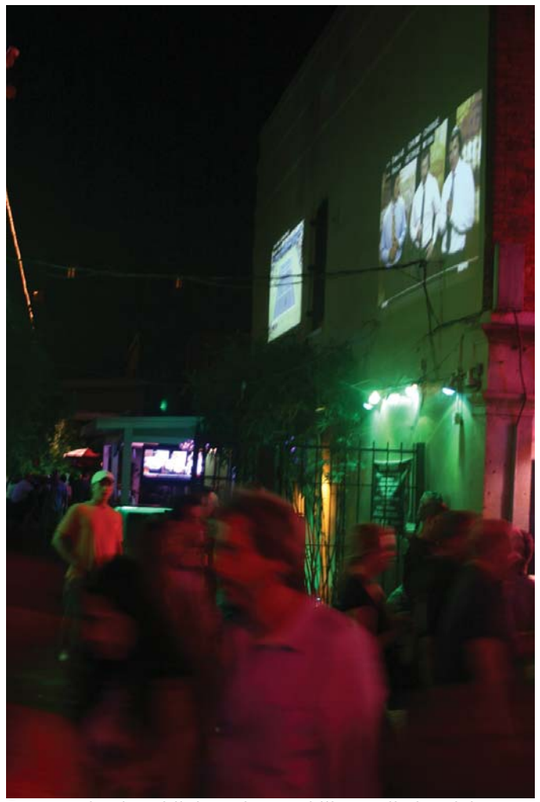
White light offers many clear benefits when compared to colored light. The ambience is perceived as brighter and more natural. This greater clarity also enhances general feelings of safety and improves function of CCTV cameras. Further, by increasing visibility for motorists, pedestrians and cyclists, roads can become safer.

The over saturation of colored light in the commercial areas results in poorer visibility and as a result increases opportunity for accidents and anti-social behavior such as theft and petty crime.

Color temperature is another light characteristic that can be principally understood as a warm or cool appearance. A sunset would be warm and a blue sky would be cool. Color temperatures, expressed in degrees Kelvin, should match one another to attain a consistent design appearance.

This document recommends the appropriate use of white light sources for illumination of streets, walkways and building facades with a high color rendering and a warm 3000K color temperature.

Poor color rendering choice results in unwelcoming and flat lighting on Bourbon St.



Saturated colored light reduces ability to distinguish important elements and features, seen here on Bourbon St. Such lack of definition can lead to increased levels of uncertainty and fear in areas with high crime.

3.5 Streetlight

The purpose of the streetlight is to provide adequate illumination for safe pedestrian and vehicular passage.

In environments like the Vieux Carré, the streetlight takes on additional requirements of providing aesthetic as well as quality of light issues that are important to the overall character of the environment.

Unfortunately, while physically the fixture and pole are of a design that strikes a relatively authentic chord with its environment, the light quality does not, nor does the location and distribution of the fixtures provide the necessary safe passage required.

The metal halide lamps currently used are glary and over-scaled for the poorly designed reflector.

Further, many fixtures are in a state of significant neglect with a large number of fixtures out or non-operational. Of those that are operational, the internal optics often have been damaged by the environment or passing traffic.

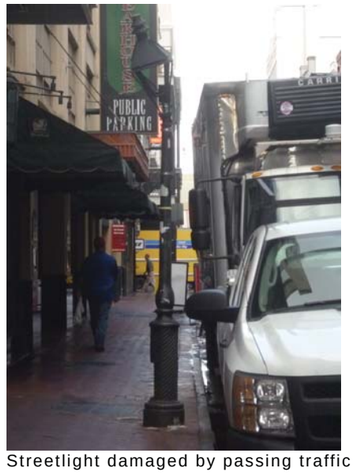
The layout of fixtures, as has been noted earlier, occurred in a piecemeal manner and overtime. Some fixtures appear to have been removed or replaced resulting in poor uniformity on many of the streets.

Finally, the streetlights must compete for space on the already cluttered sidewalks. Manhole covers, columns of balconies, galleries, streetlights, waste receptacles and newspaper stands all compete for space and prevent any sort of regular pole spacing.

All this leaves the streetlighting of the Vieux Carré in a dilapidated and dysfunctional state that requires major if not complete overhaul.

Part II of this document will focus in part on addressing the means of achieving a streetlighting solution for this historic area of New Orleans.

Lamp/Reflector detail



Streetlight damaged by passing traffic

Unsightly CCTV camera mounted to streetlight

Streetlight glare and spotty distribution on Royal

Base detail without cover plate, which is a common occurence

Typical streetlamp head and post top mounting, with the head located very close to the gallery

Damaged streetlight with signage and street furniture attachments on Royal Street

Streetlight glare and spill light on Conti St. facade

3.0 Lighting Analysis

3.5 Streetlight

The current Vieux Carré streetlamp consists of a decorative lantern with four clear glass side panels and a solid top with a 100W metal halide lamp within a hydro formed, spun aluminium reflector mounted on a 10’-6” or 13-6” decorative post. Most lanterns have a painted finish, although a few copper ones by Bevolo do exist.

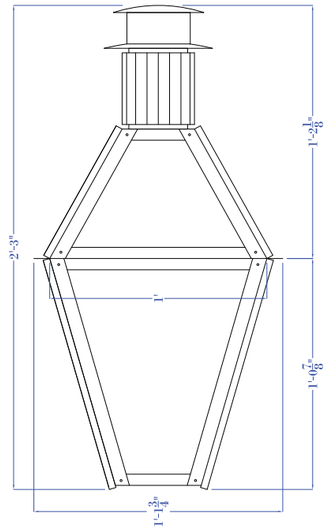
The distribution of the lamp is symmetrical but the optics are “spotty” and cause extreme disability glare.

The 13’-6” height is not appropriate with the datum of the architectural cornices of the Vieux Carré and with the center of the pole typically set back only 18” from the curb face it is prone to damage from delivery trucks. The fragile design of the post top tenon makes the fixture extremely vulnerable to damage with approximately one in every three in the area surveyed currently non-operational.

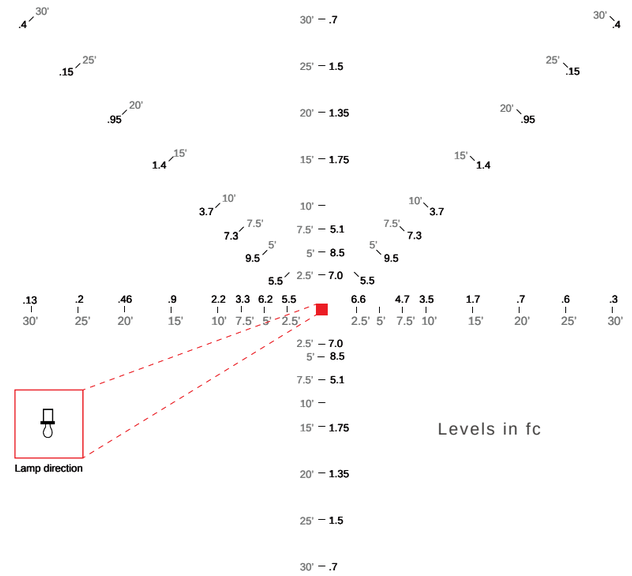
The diagrams on the right show light levels from the streetlamp as measured off-site. As can be seen, there is a significant difference in distribution between the clear and the frosted lamps. The frosted lamp provids a softer pattern of light and a greater throw. Both create too much glare and contrast within the beam footprint.

This document will propose the re-evaluation of the streetlighting system in order to provide a low glare, easily maintainable system with suitable levels of illumination and uniformity for safe passage at night as recommended in the IES Lighting Handbook 10th edition.

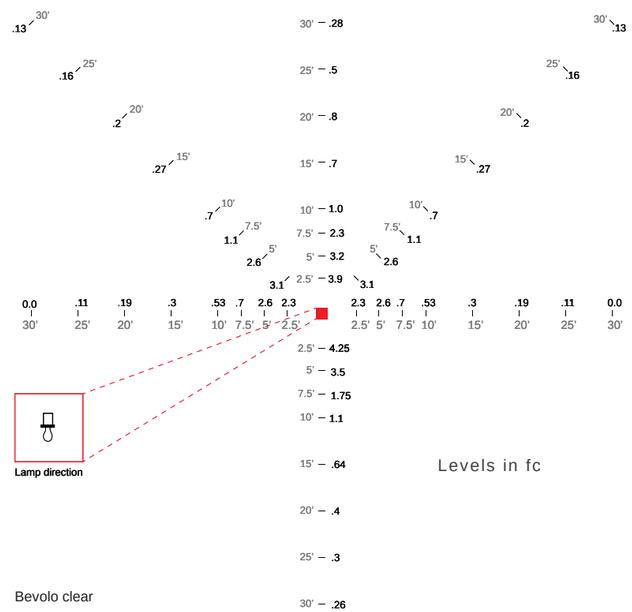
Existing pole streetlight off-site mock-up at 10’-6” mounting height with clear lamp.



Existing pole streetlight lantern dimensions

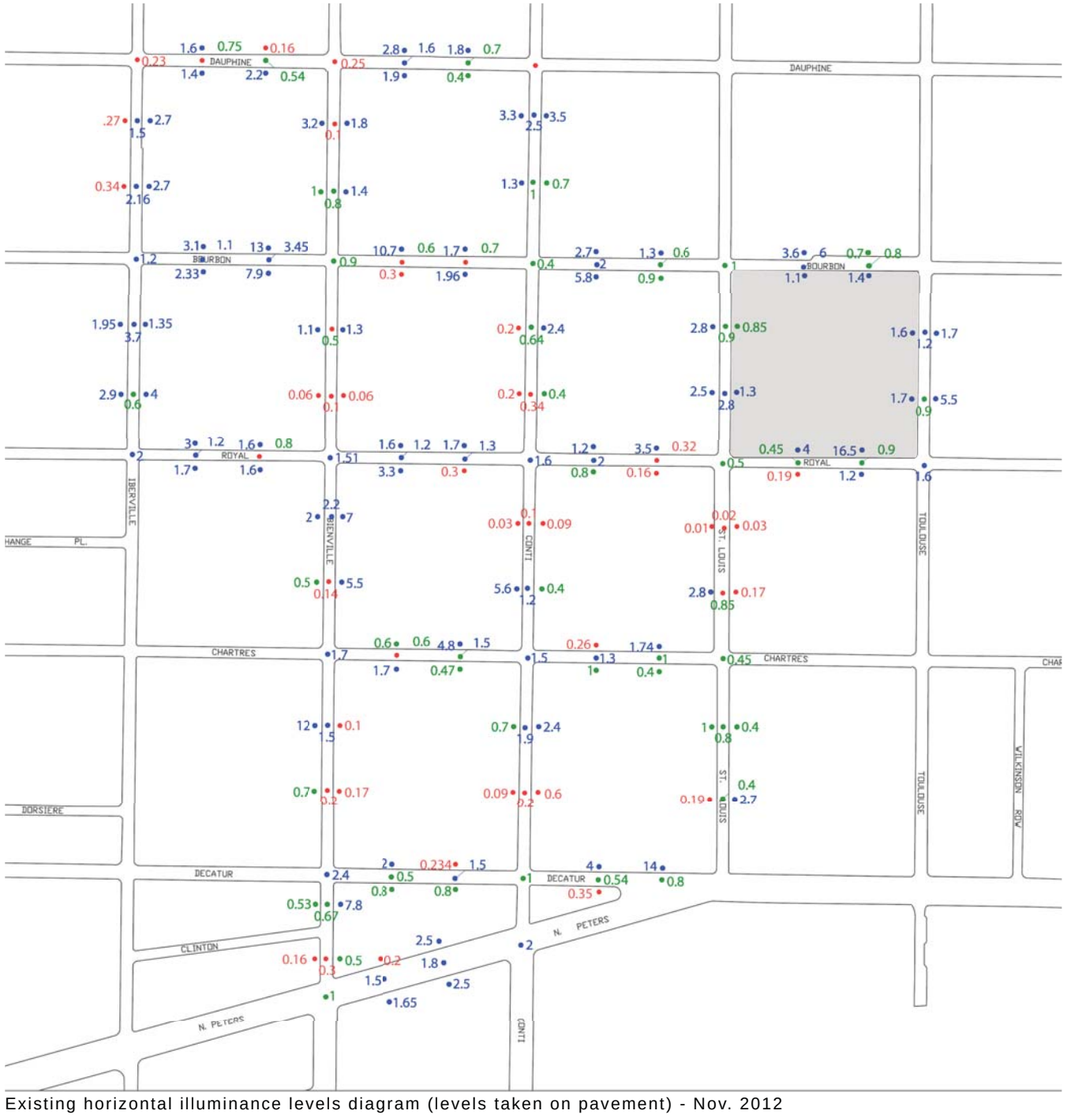


Existing pole streetlight off-site mock-up light levels (**frosted** 100W MH Lamp)



Existing pole streetlight off-site mock-up light levels (**clear** 100W MH Lamp)

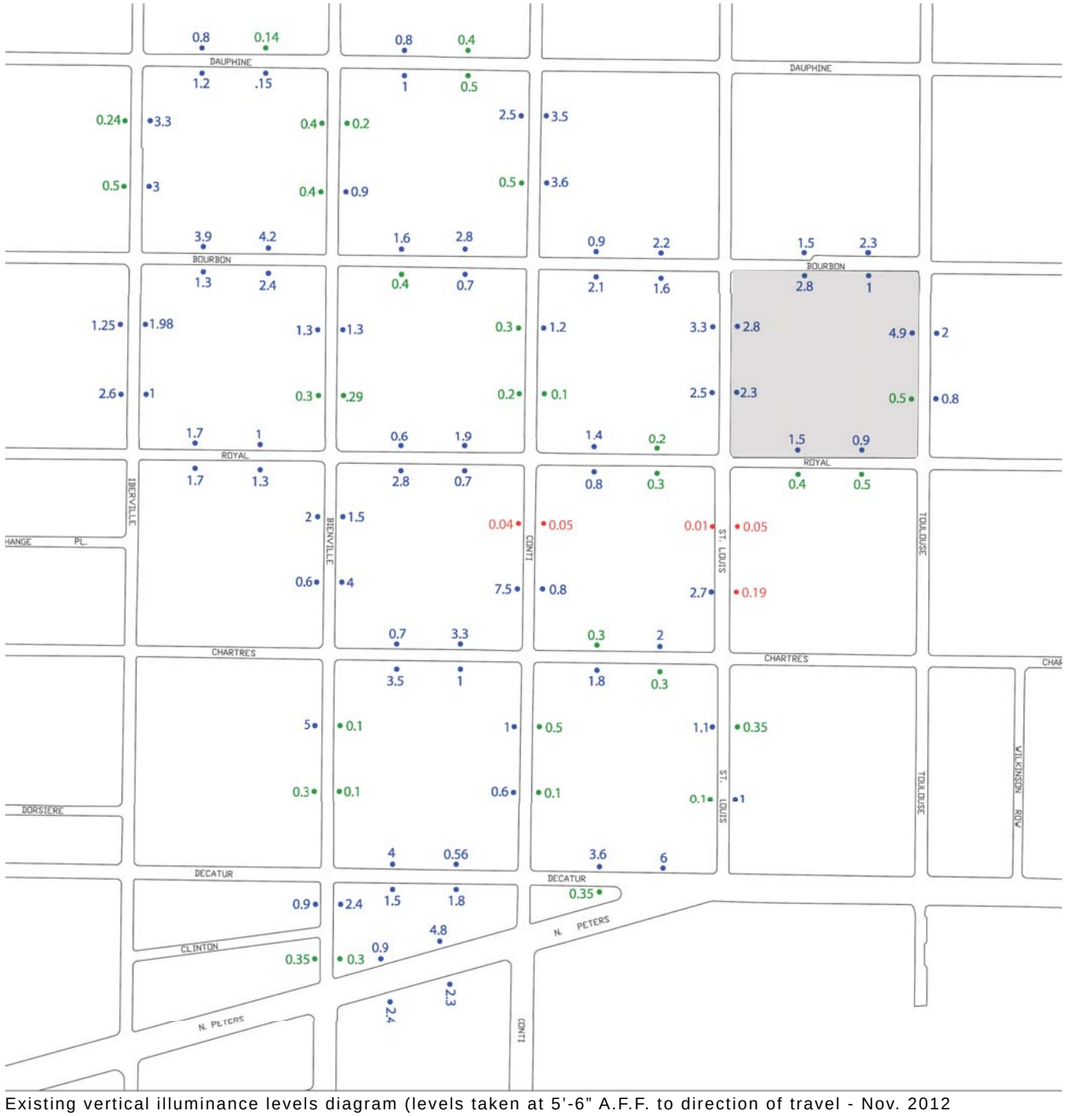
3.5 Streetlight



Existing horizontal illuminance levels diagram (levels taken on pavement) - Nov. 2012

- Below recommended levels <0.4 Fc.
- Recommended range 0.4-1.0 Fc.
- Over recommended levels >1.0 Fc.

For light level recommendations refer to table 1.1 on page 7.

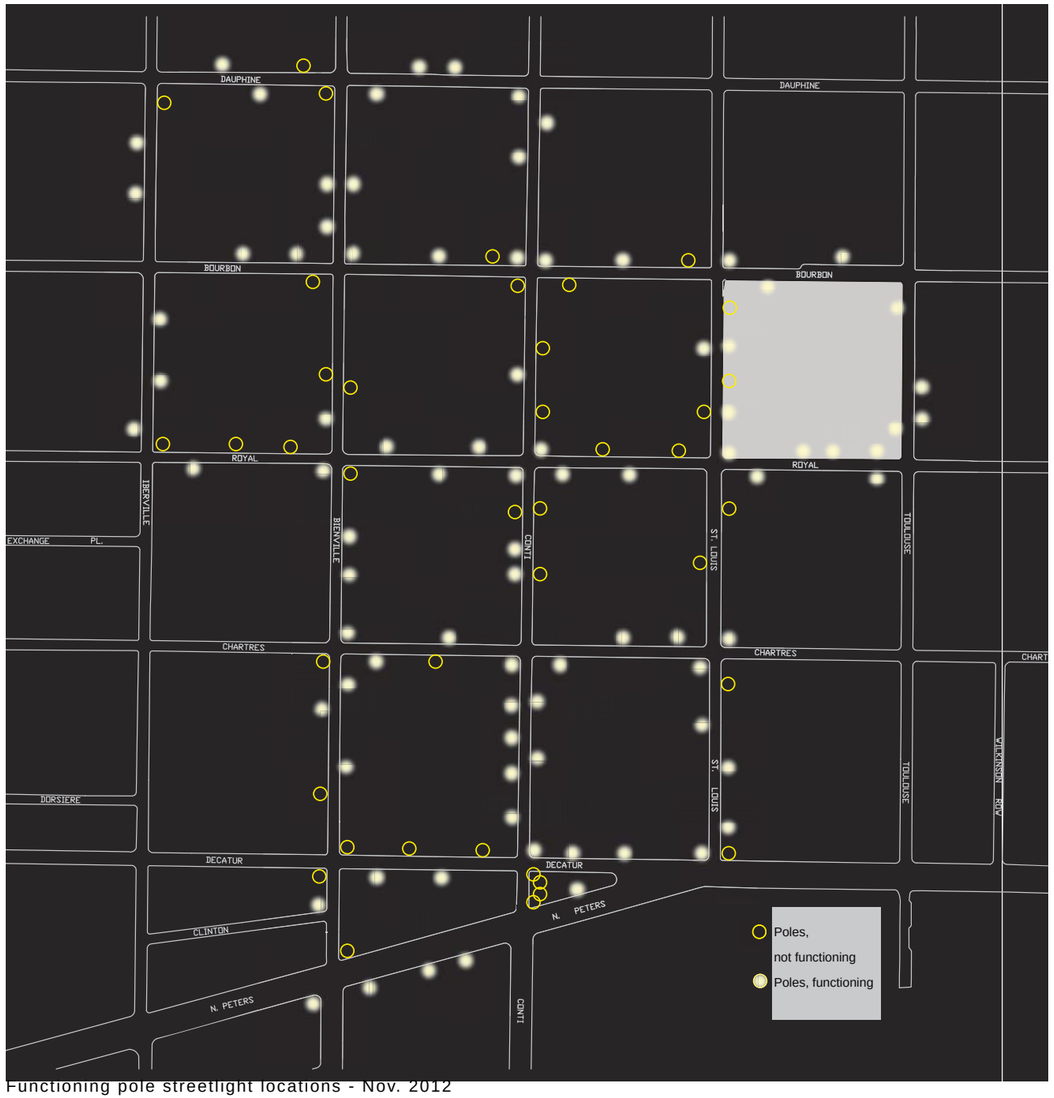


Existing vertical illuminance levels diagram (levels taken at 5'-6" A.F.F. to direction of travel - Nov. 2012

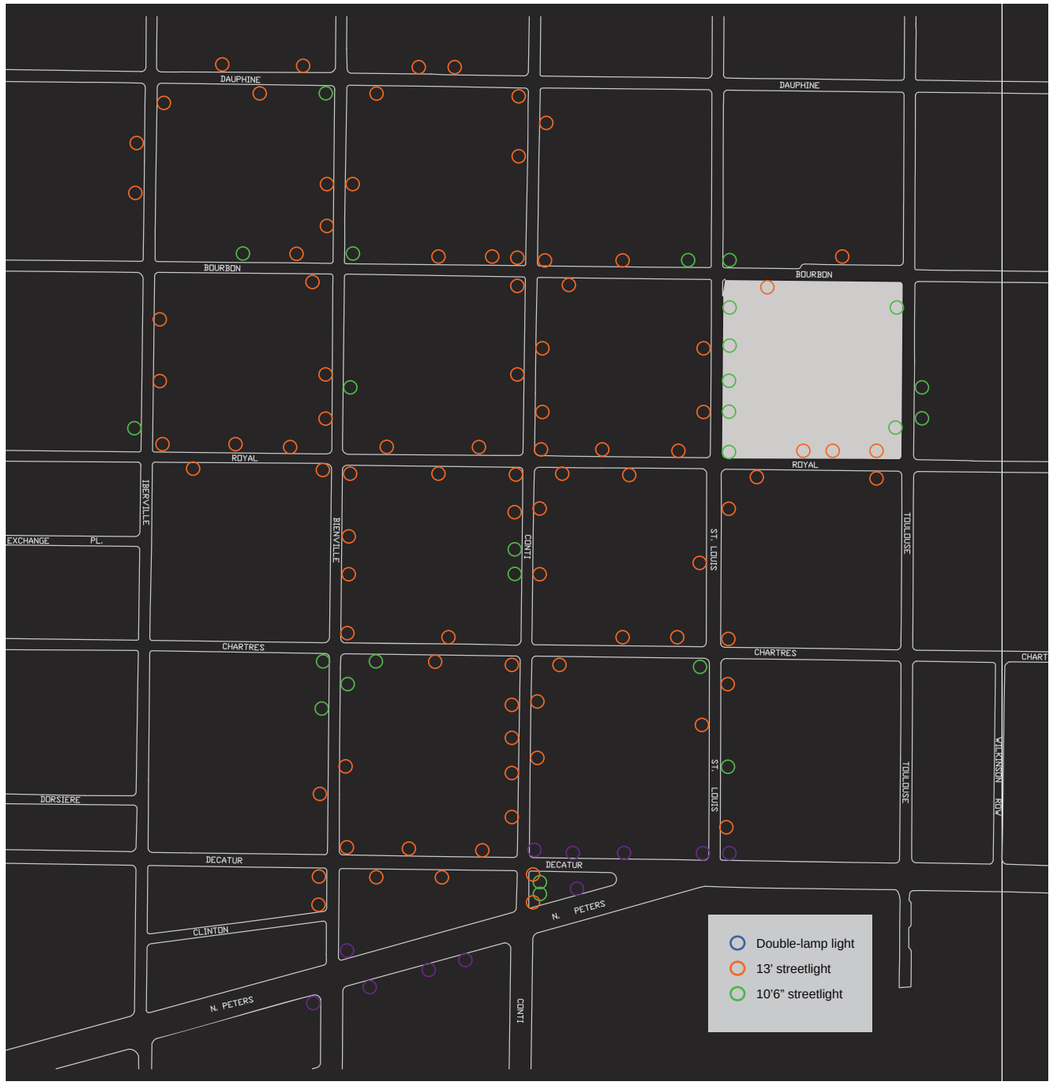
- Below recommended levels <0.1 Fc.
- Recommended range 0.1-0.5 Fc.
- Over recommended levels >0.5 Fc.

For light level recommendations refer to table 1.1 on page 7.

3.5 Streetlight



Functioning pole streetlight locations - Nov. 2012



Pole streetlight heights - Nov. 2012

3.6 Shopfronts

Storefront windows have a large part to play in the nighttime environment of the Vieux Carré. They provide animation and visual interest to the street and passerby. It could be argued there is a direct responsibility for commercial stores to provide at least a small level of illumination within their stores during hours the store is closed.

The lighting of storefronts provides perimeter streetlight, relief and depth, but also assists with feelings of well being and surveillance.

It is also important that storefronts are not overlit at night which can result in a lack of uniformity, trespass/spill light and glare.

The Vieux Carré Exterior Lighting Guidelines document Section 1.5 will recommend illumination criteria levels for shopfronts, that will require strict enforcement and adherence.

Harsh, unshielded fluorescent display lighting

Restrained window display

Overly bright and glary shopfront lighting

3.7 Signage

Despite existing specifications in the current VCC design guidelines, there appears to be an unlimited number, type, color and mounting of unique shopfront signage in the Vieux Carré. While this can provide identity and variety, it can also result in visual clutter. At night signs are illuminated in a variety of ways and there appears to be no overriding coherence or approach.

Light is used inefficiently and often over zealously to identify the store name or brand. Often, the glare from the fixture hinders one's ability to read the signs.

The Vieux Carré Exterior Lighting Guidelines document Section 1.6 will recommend illumination criteria levels for signage, that will require strict enforcement and adherence.

Overscaled neon signage

Overlit and glary sign

Stylish and subtle glowing signage

Signage adds flavor to the street atmosphere and provides wayfinding

3.8 Awnings

Awnings provide shelter and identification to commercial properties and, by nature, typically project into the street space, thereby cutting direct streetlight off from the sidewalk below.

Many awnings in the Vieux Carré contain no light within them, therefore the streets space below becomes dark, unwelcoming and potentially unsafe.

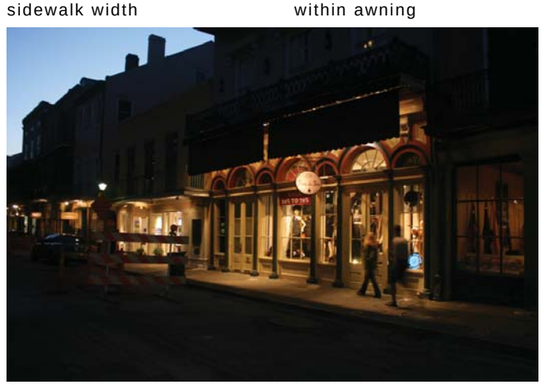
In order to avoid this, awnings should contain light within them and shall meet guidelines set out in Section 1.7 of the Vieux Carré Exterior Lighting Guidelines.

Awnings, while providing a better job of concealing light sources, will still require appropriate scale and arrangements of light fixtures as set out in Section 1.8.of the Vieux Carré Exterior Lighting Guidelines.

Awnings can obscure light at night

Awnings projecting full sidewalk width

Unsightly fixture arrangement within awning



Awnings containing light within provide supplemental light at night

3.9 Street Furniture

Alongside shopfronts and building signage, there are a large number of additional elements that contribute to the visual clutter of the streets of the Vieux Carré.

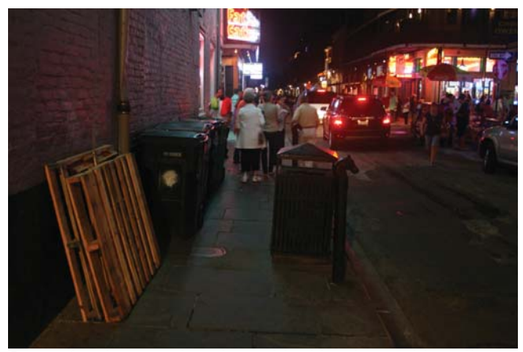
Management of these elements goes beyond the scope of this document, but it should be noted these elements do interfere with the placement of streetlights, thereby affecting the nighttime environment a great deal.

Litter bins, traffic cones and newspaper dispensers cause physical obstruction and at night can be dangerous trip hazards depending on location and surrounding levels of illumination.

This document proposes a separate investigation into design, management and maintenance of street furniture systems with full consideration given to their effects on the nighttime environment.

Garbage receptacles obstructs sidewalk

Commercial street furniture



Street furniture and garbage blocking busy sidewalk

3.10 Lighting Control

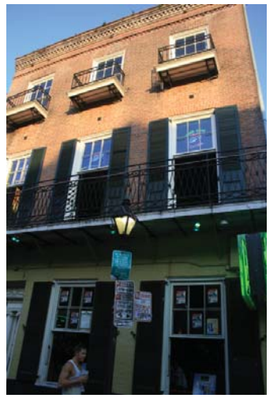
Controlling the electric lighting to respond appropriately to daylight availability and appropriate nighttime visual requirements is one of the most effective ways of creating a cohesive nighttime environment. In addition, it is one of the most effective ways of reducing lighting energy costs.

Exterior lighting in the Vieux Carré clearly is not being controlled. The images opposite show fixtures operating during bright sunlit days and at other times when lighting is not required.

Ideally, all exterior lighting applications should be controlled by a photosensor with astronomical time clock override. This is as critical for facade building lighting as it is for streetlighting.

While it may not be possible or practical to control all exterior lighting, bi-level switching and hours of operation curfew policies also help to manage lighting effect and power consumption at particular times of day and night.

The cost of a control device increases the initial system cost; however, it is typical for most applications that energy savings pay for control devices in approximately 3-7 years dependant on installation and specification type.



Light fixtures in operation during daytime hours on Toulouse and Bourbon.

3.11 Light Fixtures

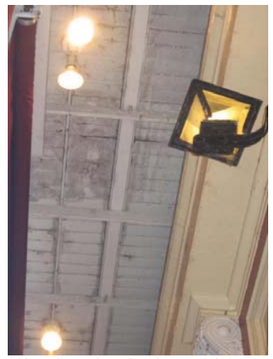
As has been noted in the history section of this document, the Vieux Carré Commission supports many different types of lighting technology. Complexity of source and application can provide much needed texture and grain, however, too many light sources installed using different technologies results in a chaotic visual field.

Providing a preferred list of technologies is one way of managing the overall daytime as well as nighttime aesthetic of the area. It is important not to forget these technologies perform different functions - decorative, utilitarian and so on - and as a result have significant implications by day as well as night.

Careful placement and consideration of all fixtures, conduits and junction boxes is imperative due to the historic character of the Vieux Carré buildings.

PAR lamp and surface-mounted conduit

Wiring, conduit & fixture types cobbled together without consideration for architecture



Mixed technologies without aesthetic consideration

Minimal historic style wall lamp with gaslight

Decorative historic style wall lamp with electric light

Ornate gas lantern

3.12 Facade Bisection

Facade bisection is the result of a lack of lighting above ground floor/plane when the ground floor/ plane is illuminated at night.

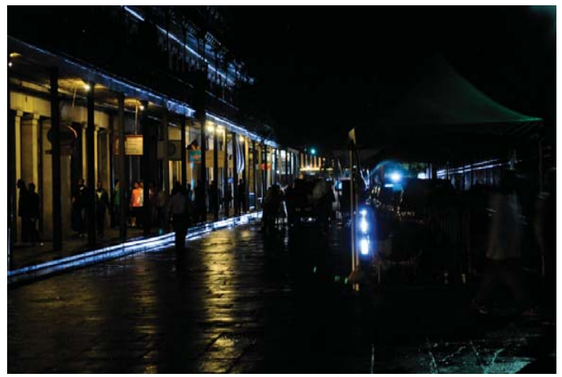
We “see” brightness; our perception of spaces depends upon how surfaces are lit. As an example, if walls are lit, then the space feels large and open. With dark surfaces, particularly overhead and on the vertical plane, spaces feel oppressive and cavernous. It is important to light vertical surfaces such as walls and building facades in order to provide an expansive, secure feeling of containment.

The facades in the commercial areas of the Vieux Carré where there is the most activity at night tend towards very definitive facade bisection resulting in each of the more negative perceptions noted above.

This document will recommend the consideration of soft illumination of facades in their entirety and not just at ground or balcony level.

Brightly illuminated interior storefronts combined with non-illuminated upper floors, seen here on St. Louis, results in very stark facade bi-section at night

Overly illuminated ground floor facades combined with non-illuminated upper floors, seen here on St. Louis, results in very stark facade bi-section at night



Facade bi-section is further highlighted when, as seen here, poor or no street lighting exists.

3.13 Traffic

Parked SUV’s and trucks cause obstruction of streetlights resulting in areas of darkness and a lack of uniformity which can contribute to the cause of accidents at night.

The images opposite show examples of how particular types of vehicles obscure light at night. While the issue of traffic is one that goes beyond the scope of this document, it is an issue that should be addressed as part of the overall nighttime urban environment.

Proposals to move traffic off-site and create pedestrian only zones or limit parking to residents are commonplace and successful to improving quality of life and safety and security throughout cities in Europe (especially during late evening hours).This document would support further investigation into the implementation of such measures.

Vehicles block streetlight from providing light to intended areas

Parked vehicles restrict street activity and useful spill light coming from storefronts along many commercial routes, such as Royal Street

4.0 Public Realm Lighting Proposal

This section includes the following topics:

4.0 Public Realm Lighting

4.1 Streetlighting Phasing Strategy

The current public realm lighting is unsatisfactory, in parts dangerous and does not meet the recommended guidelines set forth in the IESNA Lighting Handbook and ANSI/IESNA RP 8-00 for roadway lighting.

This has resulted in property owners taking it upon themselves to illuminate the public realm space directly in front and in many instances well beyond their properties.

The core issue of addressing the building mounted lighting concerns lies in providing an appropriately illuminated, uniform and easily maintained public streetlighting system.

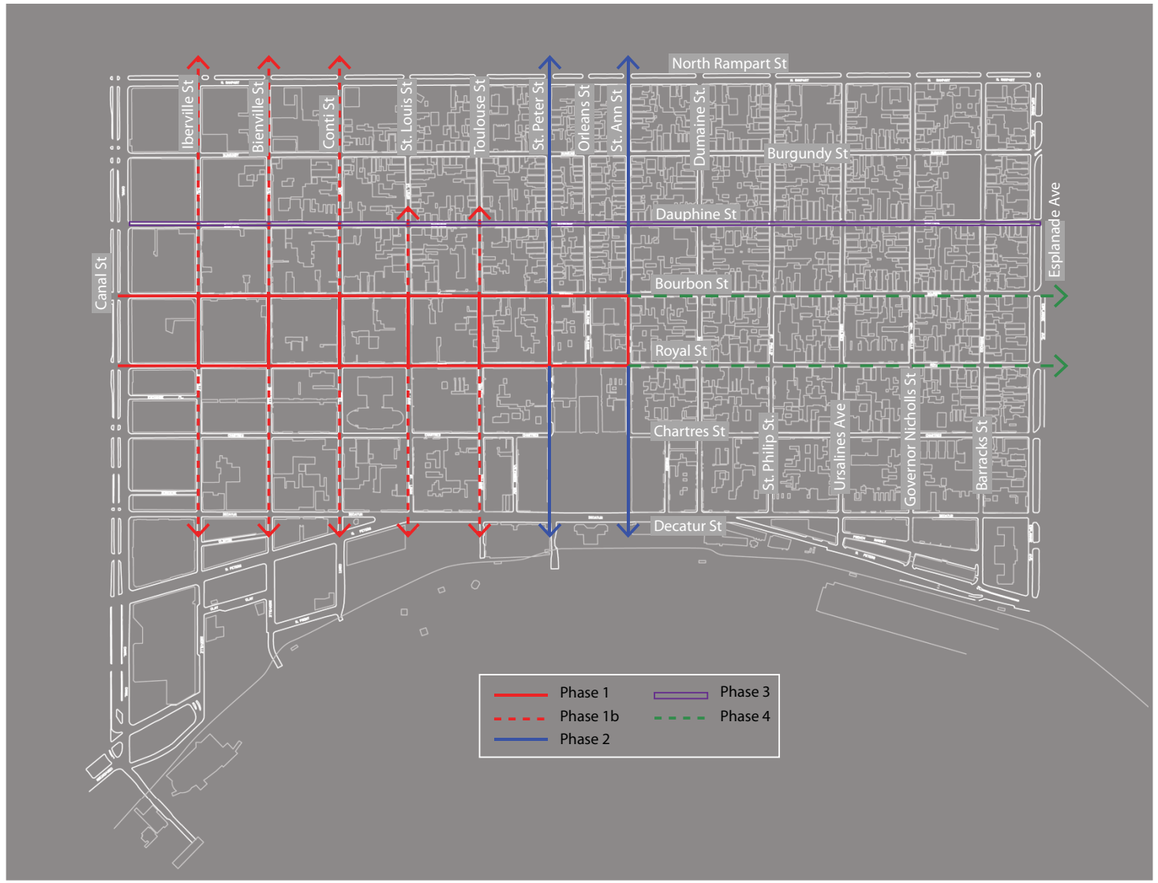
At this time, there are two* options available to the Vieux Carré in regard to its public realm lighting, that will satisfy aforemetioned code and guidelines,

1. Retrofit all non-operable existing poles with the currently used 100W Metal Halide lamps and add new poles in a similar style throughout the area, at the specific locations required, in order to best provide a cohesive and functioning streetlight system for the Vieux Carré. This option does not solve lighting glare or distribution issues and maintains current energy inefficiencies.

2. Retrofit all existing poles with the new state of the art LED's that will be contained within the existing lantern style. Add new poles in a similar style throughout the area, at the specific locations required, in order to best provide a cohesive and functioning streetlight system for the Vieux Carré.

*A new LED catenary system to replace existing streetlamps was also studied (see page 33) however is not included in detail in these pages due to the VCCF having concerns over its suitability and implementation.

*A building mounted lighting solution was discounted due to the impact on the architecture, the various mounting heights, and the occurrence of unsightly spill light onto facades.



Retrofit Street Lighting Phase Plan - The proposal is to increase the no. of streetpoles where required and appropriate only (phases 1-4, e.g. commercial traffic routes or entertainment districts), with other residential areas maintaining their current number of streetlights.

The diagram above shows a potential phasing of the retrofit scheme beginning in the heart of the commercial district Phase 1, with Phase 1b stretching out across the other main commercial streets. Phase 2 connects North Rampart with the river (a key urban connection). Phase 3 lines Dauphine extending the system northwards and finally phase 4 connects Canal St. to Esplanade Ave (the 2nd key urban connection).

All remaining residential streets could be retrofitted during or after these phases as their would be no significant increase in the no. of fixtures per street and therefore less construction requirements.

A fully programmed/scheduled approach to implementation can only take place when formal agreement has been reached to proceed with funds and legislation in place to do so.

4.0 Public Realm Lighting

4.1 Streetlighting Strategy

The tables opposite show some of the costs associated with implementing a much needed, new strategy for the streetlighting for the Vieux Carré.

Table 4.1 charts the estimated initial capital costfor equipment only and the associated maintenance and running costs, on a street by street basis, for the schemes one and two, proposed opposite.

As can be seen, the initial capital cost for the retrofit LED system is greater than the associated costs for the existing metal halide retrofit solution. However, further exploration into energy and maintenance costs reveals that, the LED retrofit system will pay for itself in approximately 10.5 years (See table 4.2).

One of the critical aspects to a fully functioning streetlighting system is that it provides the necessary leverage to stem the tide of ad-hoc building mounted and entertainment lighting masquerading as security lighting. Implementation, as a whole or by phase, will allow appropriate restrictions and guidelines to be followed and, better still, allow for retroactive removal of unnecessary and unsightly lighting solutions currently in place.

This document recommends a serious investigation into the viability of option two, with mock-ups and testing followed by investigation into funding opportunities that may exist both in the US and further afield.

Table 4.1 : Streetlighting options energy/cost comparison by **typical street**

Street Lighting System	Fixture Quantity per Street*			New Fixture Installation Cost per Unit			Existing Fixture Renovation Cost per Unit	Total Initial Cost per Street
	New	Existing	Total	Head	Pole	Suspension		
MH (Non-Residential)	2	4	6	$1,500	$2,500	n/a	$750	$11,000
MH (Residential)	1.3	2.6	4	$1,500	$2,500	n/a	$750	$7,332
LED Retrofit (Non-Res.)	2	4	6	$1,950	$2,500	n/a	$1,150	$13,500
LED Retrofit (Res.)	1.3	2.6	4	$1,950	$2,500	n/a	$1,150	$8,998

Labor assumption = 2 person hrs at $50 per hour
MH = Metal Halide
LED = Light Emitting Diode

Street Lighting System	Fixture Quantity per Street*			Wattage per Fixture	Total Wattage per Street	Cost per kWh	Hours of Operation per Year	Annual Energy Cost	Rated Lamp Life (hrs)	Cost per Lamp Replaced		No. of Lamps Replaced Over 25 Years**	Total Lamp Replacement Cost Over 25 Years	Total System Running Cost Over 25 Years
	New	Existing	Total							Lamp	Labor			
MH (Non-Residential)	2	4	6	100 W	600 W	$0.03	4000	$72.00	12000	$40	$100	48	$6,720	$8,520.00
MH (Residential)	1.3	2.6	4	100 W	400 W	$0.03	4000	$47.99	12000	$40	$100	32	$4,479	$5,678.58
LED Retrofit (Non-Res.)	2	4	6	26 W	156 W	$0.03	4000	$18.72	50000	$75	$100	12	$2,100	$2,568.00
LED Retrofit (Res.)	1.3	2.6	4	26 W	104 W	$0.03	4000	$12.48	50000	$75	$100	8	$1,400	$1,711.57

* Fractional light fixture quantities are a result of dividing total fixture counts into street averages.
** 25 years encompasses 8 lamp replacements for metal halide and 2 lamp replacement for LED.

Table 4.2 : Streetlighting options initial cost and payback period comparison for the **entire** Vieux Carré

	No. of Residential Streets	No. of Non-Residential Streets	Fixture Quantity	Total Initial Cost	Average Annual Savings (vs. MH)	Payback Period (years)		
Existing Metal Halide	82	62	700	$1,283,183	N/A	N/A	Estimated total costs (including installation)	**$2,566,36**
All LED Retrofit	82	62	700	$1,574,815.50	$27,773	10.5	Estimated total costs (including installation)	**$3,149,631**

Note:

All estimated costs in the tables are based on projected Distributor Net (DN) prices and are not final quotations. Typically allow a 20-30% distributor mark-up on top of these to achieve contractor price.

The above estimated costs do NOT include installation, circuiting, delivery, taxes, contractors' mark up, profit, lamp supply or overhead. Typically allow a 50:50 split between contractor cost and installation costs for final installed cost.

These costs and associated running costs are based on the best information available at the time, given that many details and discussions are still to take place before any agreement to implement.

The purpose of these tables is to create an understanding of the implications of the proposal and the further steps to be negotiated going forward.

4.2 LED Retrofit Streetlight

The retrofit LED solution will combine state of the art lighting technology with the existing stock of historic poles and lantern heads.

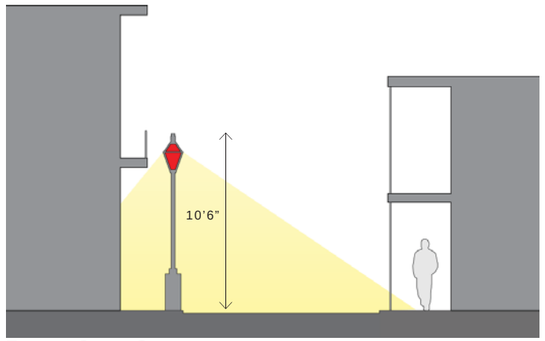
The LED light engine would be fitted to the existing lanterns and come with specifically designed distribution in order to achieve the lighting levels and desired effect for each street. The lantern glass will be clear or slightly frosted at the top to further reduce glare.

The LED light engine is a wet-location module equipped with an integral driver and a quick disconnect for easy replacement. It will have a rated lamp life of at least 50,000 hours (possibly up to 100,000 hrs), a power consumption of 26W, and over time will save greatly on energy and maintenance costs. The engines will ultimately pay for themselves, when compared to a retrofit scheme that incorporates the existing metal halide lamps, in approximately 10.5 years.

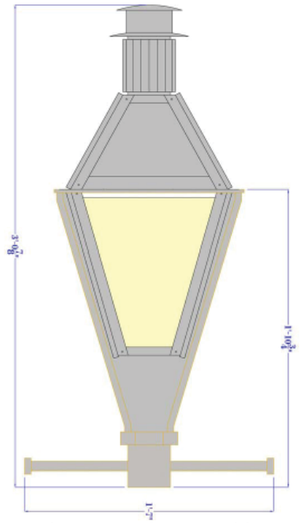
The diagrams opposite show the typical layout required per street in order to achieve desired illumination levels.

One drawback of this scheme is that the ideal pole locations and layout may not be possible due the location of existing balconies or below grade utilities.

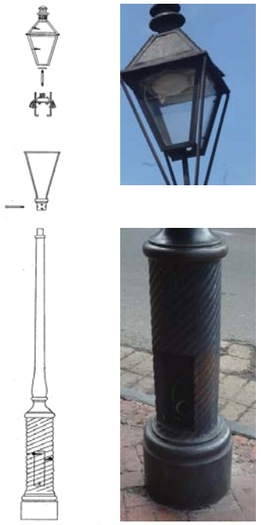
Further, the columns proposed at the original height of 13’ 6” will still be susceptible to damage by delivery trucks unless this issue can be addressed by other means through the Department of Transportation or the Department of Public Works.



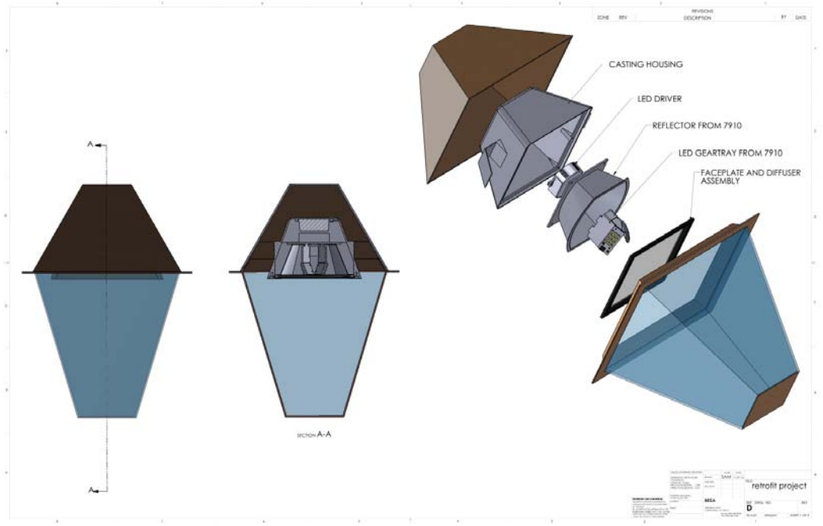
Typical Cross Section



Bevolo Copper Lantern with retrofit LED light engine

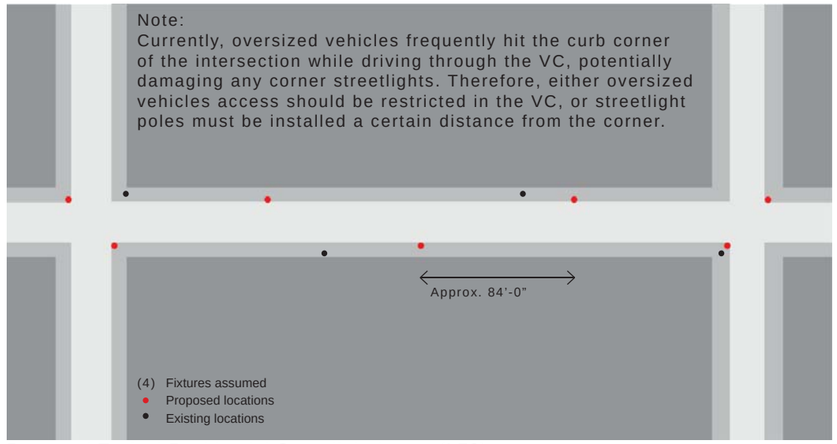


Standard VC Pole Base and Lantern

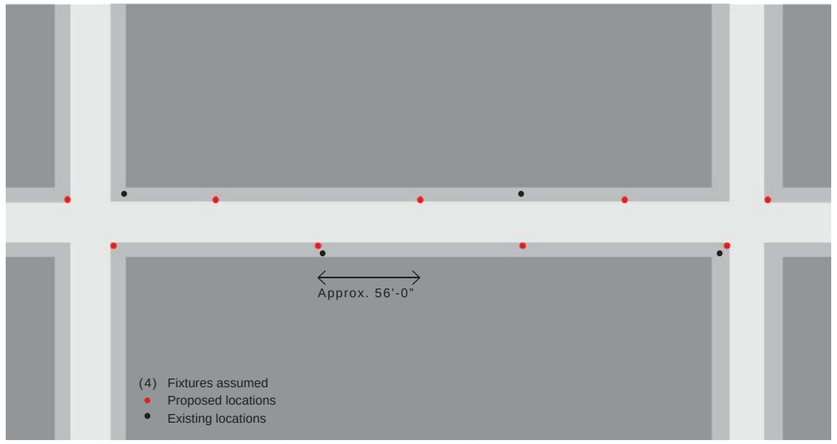


LED light engine retrofit Bevolo Copper Lantern

Note:
The lantern must be installed such that the horizontal poles are parallel to the streets to avoid obstruction of vehicles.



Proposed Typical Residential Streetlight layout (LZ2)



Proposed Typical Commercial Streetlight layout (LZ3)

4.3 LED Catenary System

Lighting catenary systems is a lighting system suspended between buildings or poles and is traditionally found in historic districts, most notably and successfully in Europe.

The Vieux Carré LED catenary system light would be suspended between poles and/or building facades and come with specifically designed light distribution in order to achieve appropriate illumination and desired effect for each street.

The dimmable LED light fixture will have a rated lamp life of at least 50,000hrs (possibly up to 100,000 hrs), a power consumption of 40W and over time will save greatly on energy and maintenance costs. Ultimately paying for itself, in comparison to a retrofit scheme that incorporates the existing metal halide lamps, in approximately 13.3 years.

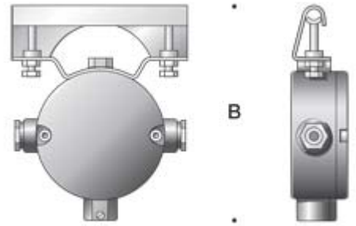
The diagrams opposite show the typical layout required per street to achieve desired illumination levels.

Fixtures will be mounted at 16'0" or as required to avoid damage by fire truck, delivery and parade vehicle. The pole will be cast aluminum 6-8" in diameter and is equipped with 4 vertical grooves for signage mounting.

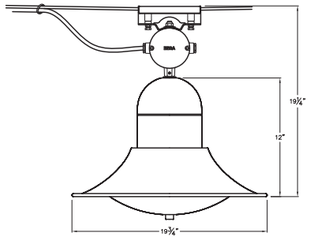
The fixture will be secured to facades or poles and suspended between stainless steel cable.

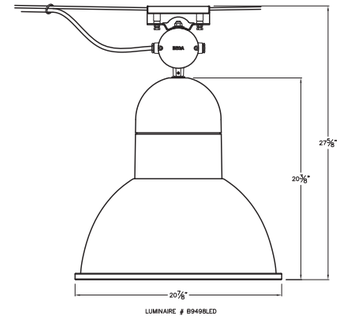
LED Catenary System Rendering

Note:
The committee is not in favor of this system and would like to eliminate it because they have deemed it to be impractical and distracting.

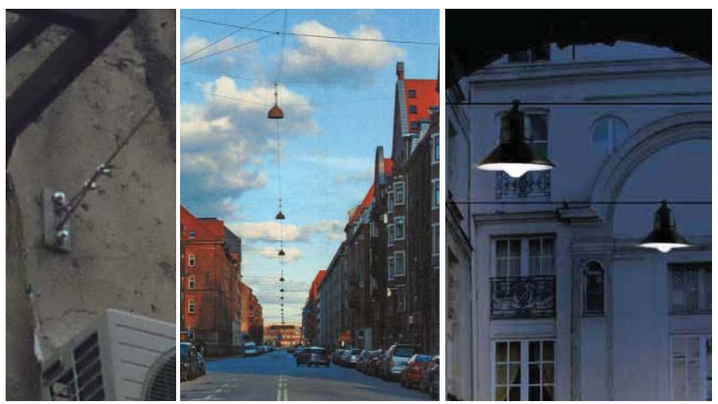


Cable Hanger for Catenary System

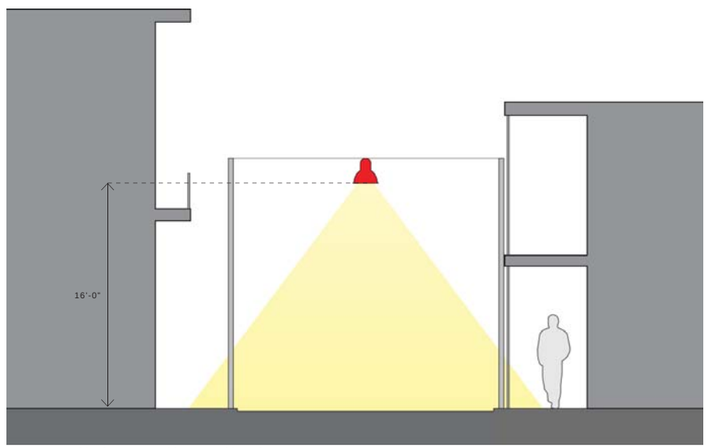




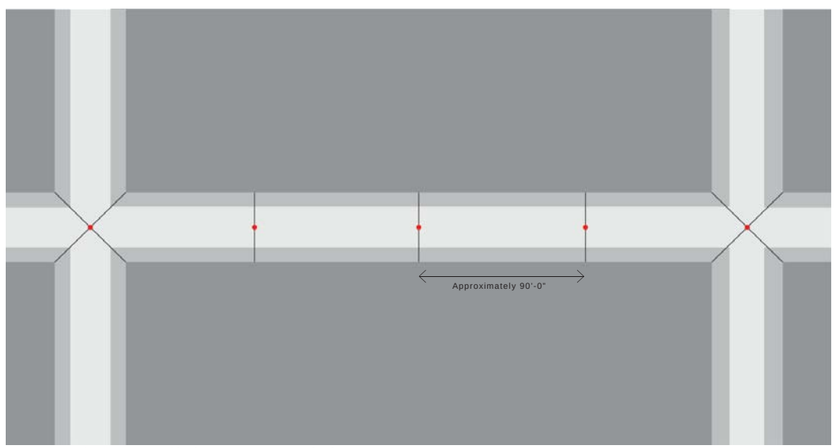
LED Catenary Fixture
26 watt to 40 watt



Catenary Lighting in Europe



Typical Catenary Cross Section

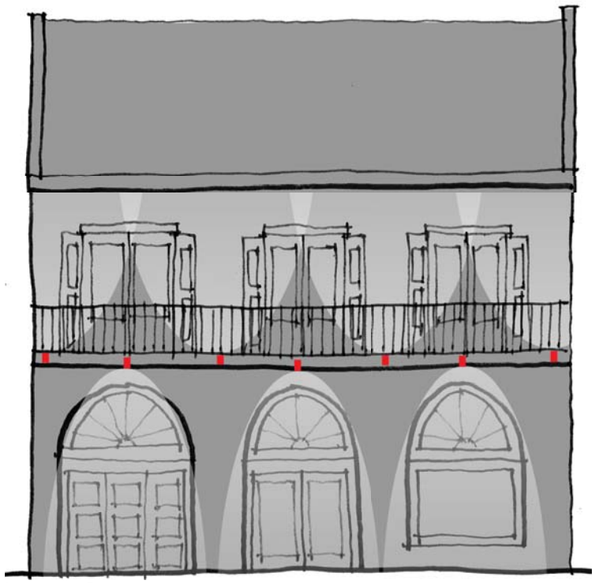


Typical Proposed Catenary Layout Plan

4.4 Selected Before and After Renderings

722 Toulouse

Subtle accenting of facade entrances with soft up-lighting of balcony soffits, achieved by adjustable MR16 LED spot/floodlights, provides a discrete and harmonized lighting solution.



Lighting Strategy

Existing Conditions

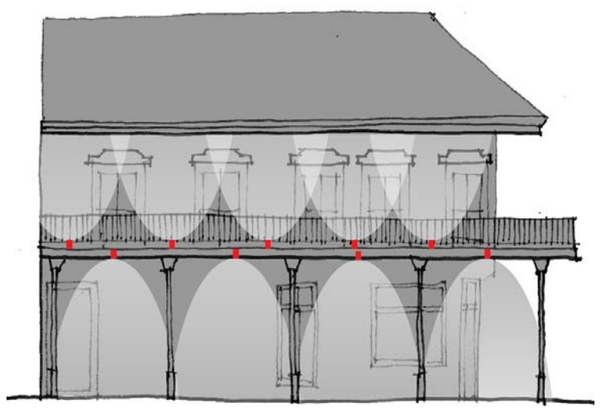
Existing Conditions

Proposed Lighting

4.4 Selected Before and After Renderings

441 Royal

Uniform and glare-free illumination of facade and soft uplighting of galleria soffits, achieved by adjustable MR16 LED spot/floodlights, provides a discrete and memorable lighting solution.



Lighting Strategy

Existing Condition

Proposed Lighting

4.5 Lighting Mock-up Summary

Streetlight Mock-up

The images opposite from the site mock-up of March 21st show significant reduction in glare and increase in light quality and distribution with LED lighting solution.

Existing Metal Halide fixtures

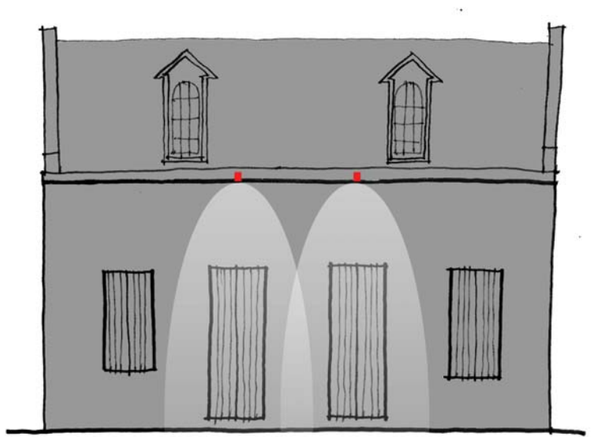
Proposed LED fixtures

Mock-up comparison

4.5 Lighting Mock-up Summary

726 Toulouse

Uniform and glare-free illumination of entrances achieved by adjutable MR16 LED spot/floodlights provides a discrete and functional lighting solution.



Lighting Strategy

Photo (before)

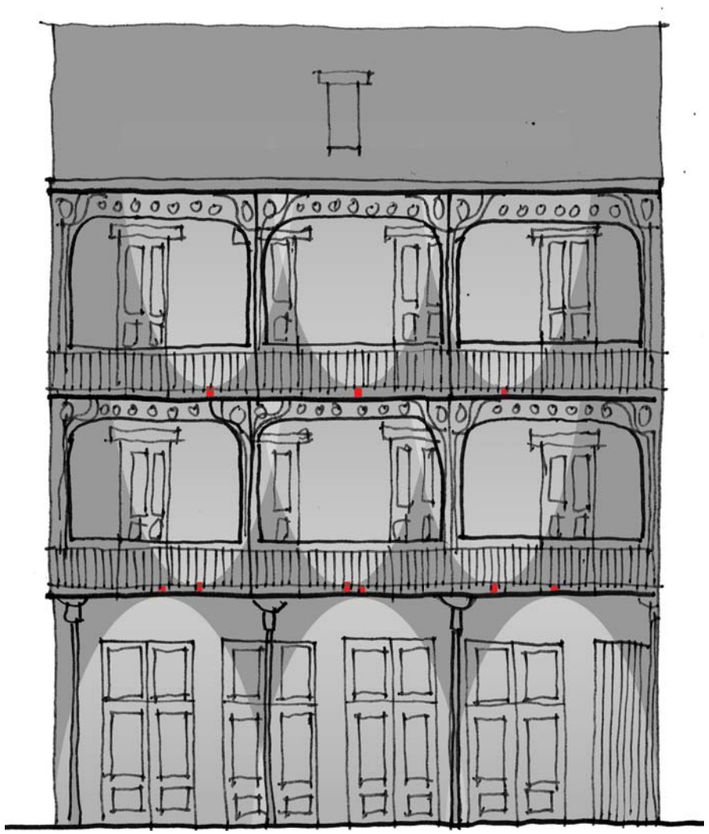
Mock-up photo

Mock-up rendering

4.5 Lighting Mock-up Summary

Antoine's Restaurant / Herme's Bar
713 St. Louis

Uniform and glare-free illumination of facade and soft uplighting of galleria soffits, achieved by adjutable MR16 LED spot/floodlights, provides a discrete, memorable and harmonized lighting solution.



Lighting Strategy

Photo (before with soffit mounted lights)

Mock-up photo

Mock-up rendering

Glossary of Terms

• **Ambient lighting:** lighting throughout an area that produces general illumination.

• **Baffle:** a single opaque or translucent element to shield a source from direct view at certain angles, to absorb or block unwanted light, or to reflect and redirect light.

• **Ballast:** a device used with an electric-discharge lamp to obtain the necessary circuit conditions (voltage, current, and waveform) for starting and operating a lamp.

• **Beam angle:** the angle between the two directions for which the intensity is 50% of the maximum intensity as measured in a plane through the nominal beam centerline. For beams that do not possess rotational symmetry, the beam angle is generally given for two planes at 90°, typically the maximum and minimum angles.

• **Beam spread:** the angle between the two directions in the plane in which the intensity is equal to a stated percentage of the maximum beam intensity.

• **Brightness:** the subjective response to luminance in the field of view dependent upon the adaptation of the eye.

• **CDM:** Ceramic Discharge Metal Halide; a variety of high color rendering metal halide sources utilizing ceramic arc tube technology and electronic control gear for improved lamp color stability over standard metal halide sources. CDM sources are the preferred metal halide source for the reasons listed above.

• **Color Rendering:** a general expression for the appearance of surface colors when illuminated by light from a given source, consciously or unconsciously, with their appearance under light from some reference source. ‘Good color rendering’ implies similarity of appearance to that under an acceptable light source, such as daylight.

• **CRI (Color Rendering Index):** a measure of the degree of color shift objects undergo when illuminated by the light source as compared with those same objects when illuminated by a reference source of comparable color temperature. With reference to fluorescent and blended lamp sources, a CRI of 80 minimum is preferred for sufficient color rendition. The CRI range is 0-100 (100 meaning no color shift).

• **Color Temperature:** the temperature of a full radiator which emits radiation having a chromaticity nearest to that of the light source being considered. For example, the color of a full radiator at 3500K is the nearest match to that of a white tubular fluorescent lamp. Incandescent sources range in color temperature from 2700K to 3000K. Fluorescent sources range in color temperature form 3000K to 6500K.

• **Compact fluorescent lamp:** A type of fluorescent lamp smaller is size than linear fluorescent lamps. They are used in many different luminaire types but are most commonly used in recessed downlight luminaires. See Section 7 for further clarification.

• **Cutoff angle:** (of a luminaire) the angle, measured up from nadir, between the vertical axis and the first line of sight at which the bare source is not visible.

• **Diffuse:** a surface finish which uniformly spreads light in all directions. See Section 11 for further clarification.

• **Direct lighting:** lighting involving luminaires that distribute 90 to 100% of the emitted light in the general direction of the surface to be illuminated. The term usually refers to light emitted in a downward direction.

• **Downlight:** a small direct lighting unit that directs the light downward and can be recessed, surface-mounted, or suspended.

• **Downlighting:** a system designed with direct lighting units that directs the light downward and can be recessed, surface-mounted, or suspended. See ‘Direct Lighting.’

• **Efficacy:** the ratio of the luminous flux emitted from a lamp to the power consumed by the lamp, measured in lumens per watt.

• **Efficiency:** the ratio of the total luminous flux exiting from a luminaire to the total luminous flux emitted from the source.

• **Fixture:** an apparatus which controls the distribution of light given by a lamp or lamps and which includes all the components necessary for fixing and protecting the lamps and for connecting them to the supply circuit. The term ‘luminaire’ is synonymous with ‘fixture’.

• **Floodlight:** a luminaire that provides general illumination to an area or building surface. It usually is capable of being pointed in any direction and is of weatherproof construction.

• **Floodlighting:** a lighting technique, which provides direct general frontal illumination to an object, building or object. This technique can be for exterior, advertising, or decorative purposes.

• **Footcandle; fc:** a unit of illuminance equal to 1 lumen/square foot or 10.76 lux.

• **Fluorescent lamp:** a low-pressure mercury electric-discharge lamp in which a fluorescing coating (phosphor) transforms some of the UV energy generated by the discharge into light.

• **Glare:** the discomfort or impairment of vision experienced when parts of the visual field are excessively bright in relation to the general surroundings.

• **Halogen:** the name given to a family of electronegative elements, including bromine, chlorine, fluorine, and iodine.

• **High-pressure sodium lamp (HPS):** a high-intensity discharge (HID) lamp in which light is produced by radiation from sodium vapor operating at a partial pressure of about 1.33 × 104 Pa (100 Torr). Includes clear and diffuse-coated lamps.

• **IES:** the Illuminating Engineering Society of North America

• **Illuminance:** The luminous flux density at a surface; the luminous flux incident per unit area (measured in lux). Also see ‘illumination.’

• **Illumination:** an alternative but deprecated term for illuminance. It is frequently used because “illuminance” is subject to confusion with “luminance” and “illuminants,” especially when not clearly pronounced. The term “illumination” is synonymous with “lighting”.

• **Incandescent lamp:** a lamp in which light is produced by a filament heated to visible radiation by an electric current. Normally, the filament is of coiled or coiled-coil (doubly coiled) tungsten wire. However, it can be uncoiled wire, a flat strip, or of material other than tungsten.

• **Indirect lighting:** lighting involving luminaires that distribute 90 to 100% of the emitted light upward.

• **Kelvin:** the unit of reference used to designate the color temperature of a light source. See ‘Color Temperature’.

• **Lamp:** a generic term for a source created to produce optical radiation. By extension, the term is also used to denote sources that radiate in regions of the spectrum adjacent to the visible.

• **Lamp Life:** For filament and blended lamps, this is the time at which 50% of a large sample batch have failed. For fluorescent lamps, this is the time at which the light output of a large sample batch has fallen to 50% of the 100-hour burned-in value. ‘Lamp Life’ is synonymous with ‘Life’.

• **LED; Light Emitting Diode:** A semiconductor diode that converts applied voltage to light.

• **Lens:** a glass or plastic element used in luminaires to change the direction and control the distribution of light rays; also, the part of the eye that allows objects at different distances to be focused onto the retina.

• **Light Loss Factor (LLF):** the ratio of illuminance for a given area to the value that would occur if lamps operated at their (initial) rated lumens and if no system variation or depreciation had occurred. Components of this factor can be either initial or maintained. The Light Loss Factor is used in lighting calculations as an allowance for lamp(s) or luminaire(s) operating at other than rated conditions (initial) and for the depreciation of lamps, light control elements, and room surfaces to values below the initial or design conditions, so that a minimum desired level of illuminance can be maintained in service. The Light Loss Factor is the product of the Ballast Factor x Lamp Lumen Depreciation x Luminaire Dirt Depreciation x Room Surface Dirt Depreciation. Formerly referred to as the Maintenance Factor.

• **Louver:** a series of baffles used to shield a source from view at certain angles, to absorb or block unwanted light, or to reflect or redirect light. The baffles are usually arranged in a geometric pattern.

• **Low voltage:** a 12 or 24 volt power system utilizing a step-down transformer.

Glossary of Terms

• **Lumen, lm:** the luminous flux emitted within a unit solid angle (1 steradian) by a point source having a uniform luminous intensity of 1 candela (cd).

• **Luminaire:** an apparatus which controls the distribution of light given by a lamp or lamps and which includes all the components necessary for fixing and protecting the lamps and for connecting them to the supply circuit.

• **Luminance:** the physical measure of the stimulus which produces the sensation of brightness measured by the luminous intensity of the light emitted or reflected in a given direction from a source element, divided by the projected area of the element in the same direction (L or candelas/m2).

• **Luminance Contrast:** The absolute difference between the reflectance values of two non-reflective surfaces.

• **Luminous flux:** the light emitted by a source, or received by a surface (lumen).

• **Luminous intensity:** a quantity which describes the power of a source or illuminated surface to emit light in a given direction (candela).

• **Maintenance Factor:** See 'Light Loss Factor'

• **Mercury lamp:** a high-intensity discharge (HID) lamp in which the major portion of the light is produced by radiation from mercury operating at a partial pressure in excess of 105 Pa (approximately 1 atmosphere). Includes clear, phosphor-coated (mercury- fluorescent), and self-ballasted lamps.

• **Metal halide lamp:** a high-intensity discharge (HID) lamp in which the major portion of the light is produced by radiation of metal halides and their products of dissociation—possibly in combination with metallic vapor such as mercury. Includes clear and phosphor-coated lamps.

• **PAR (Parabolic Aluminized Reflector):** the incandescent, tungsten-halogen or metal halide lamp variety which has a parabolic reflector surrounding a lamp capsule.

• **Partly cloudy day:** a day that has 30 to 70 percent cloud cover. Also see clear day and cloudy day for correlated words.

• **Photometry:** the measurement of quantities associated with light.

• **Pole:** the vertical hollow structure with base used to support the bracket arm and luminaire.

• **Pole mounted luminiare:** a luminaire that is attached to the end of structural light pole bracket arm.

• **Power Density:** The ratio of the total power consumed from lighting luminaires within a particular space divided by the room area (Watts / square foot).

• **Reflectance:** the ratio of the reflected flux to the incident flux.

• **Recessed luminaire:** a luminaire that is mounted above the ceiling (or behind a wall or other surface) with the opening of the luminaire level with the surface.

• **Source:** a type of lamp from which light originates, such as an incandescent or fluorescent lamp.

• **Specular:** a surface finish having the properties of a mirror in which the angle of incidence equals the angle of refraction.

• **Task lighting:** lighting directed to a specific surface or area that provides illumination for visual tasks.

• **Transmittance, transmission:** the ratio of the transmitted flux to the incident flux. It should be noted that transmittance refers to the ratio of flux emerging to flux incident; therefore, reflections at the surface as well as absorption within the material operate to reduce the transmittance.

• **Tungsten-halogen lamp:** a gas-filled tungsten filament incandescent lamp containing a certain proportion of halogens in an inert gas whose pressure exceeds 3 atmospheres.

• **UL (Underwriters Laboratory):** The governing product testing agency that tests and evaluates the standards for safe operation of most electrical components.

• **Uniformity:** Over a given task area, the ratio of the minimum illuminance to the average illuminance.

• **Uplight:** an indirect light luminaire that directs the light upward and can be grade recessed, surface-mounted, or suspended.

• **Wall Washer:** a recessed, surface-mounted, or suspended lighting unit that directs the light asymmetrically to evenly illuminate a vertical surface.

• **Watt:** the unit of power. In electrical calculations, one watt is the power produced by a current of one ampere across a potential difference of one volt. The symbol often used in equations is "W."

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